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CONTENTS

		PAGE
Filtration operations for glaucoma	*William H. Crisp*	277
Statistical study of retinal detachment	*Cecil H. Bagley*	285
Saline injections in retinal detachment	*Edwin G. Grafton, Jr., and Jack S. Guyton*	299
Integrated eyes and implants	*Wendell L. Hughes*	303
Oxycephaly with optic atrophy	*Jack V. Lisman*	311
Lid repair and reconstruction	*Sidney A. Fox*	317
Injuries from noncasualty war gases	*George I. Uhde*	323
Intumescent cataract extraction	*Louis Daily, Jr., and Ray K. Daily*	328
Exudative cysts of the iris	*Maxwell Thomas and Ronald Burnside*	331
Clinic for binocular problems	*Paul W. Miles*	333
Use of goniolens in foreign-body diagnosis	*M. J. Reeh*	336
Congenital retinal fold	*I. J. Eisenberg*	337

DEPARTMENTS

Society Proceedings	339
Editorials	345
Obituary	350
Correspondence	351
Book Reviews	352
Abstracts	355
News Items	385

For complete table of contents see advertising page VII

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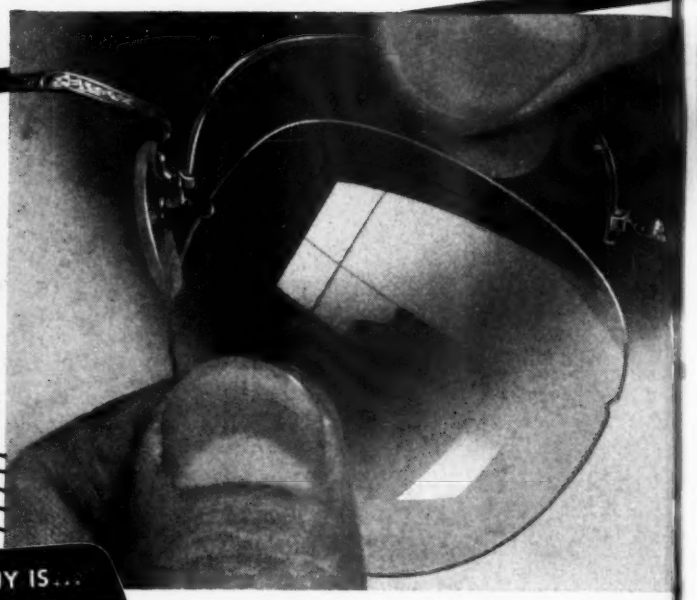

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AMERICAN JOURNAL OF OPHTHALMOLOGY

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EARLY DEVELOPMENT OF THE FILTRATION OPERATIONS FOR GLAUCOMA

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The problem of glaucoma is far from solved, and this disease is still the most frequent cause of incurable blindness among persons past middle age. But it can at least be said that the prospect of surgical relief from this disorder, or group of disorders, has vastly improved in the last half century.

It is now nine decades since Albrecht Graefe[1] first announced that he had found in surgical iridectomy a cure for many cases of glaucoma, especially acute glaucoma. He himself was prompt to admit that the operation was not always successful even in acute cases, and that its success, or at least its complete success, was rather the exception than the rule in the chronic type of the disease. Conjectures and observations arising out of this fact played a considerable part in the later invention of operations which have proved much more reliable for the chronic cases.

In earlier editions of de Schweinitz's *Diseases of the Eye*, that author[2] remarked that one of the complications following the operation of iridectomy in glaucoma was the formation, at the seat of the incision, of a bulging scar sometimes called a cystoid cicatrix; and that on the other hand, in severe cases, this very cystoid cicatrix, by permitting a filtering of the liquids, had sometimes been described as a favorable condition; but that to this view of a cystoid scar the author could not subscribe.

William Campbell Posey,[3] writing on glaucoma in the *American Encyclopedia of Ophthalmology*, regarded Graefe's discovery of iridectomy for glaucoma as "the greatest contribution which has been made to ophthalmic science." Yet, within relatively few years after Graefe's introduction of this operation, various authors proposed other surgical methods of treatment.

Thus de Wecker,[4] in 1867, put forward the operation which he termed anterior sclerotomy, by which it was hoped to establish at the angle of the anterior chamber a cicatrix through which the intraocular fluids might filter out of the eye. Four years later the same author announced a modification of his original operation, in order to avoid prolapse of the iris. This he sought to accomplish by carrying the cutting edge of the knife slowly through the limbal structures until only a 2-mm. bridge of undivided tissue remained.

Panas[5] made an incision with the Graefe knife below and to the outer side, and plunged the knife through the iris for 8 to 10 mm., cutting both iris and sclera in association with a 2- or 3-mm. wound of exit from the anterior chamber. De Wecker[6] later tried the effect of iridodialysis made by pulling the iris toward the pupil after a keratome incision at the limbus. In England, Bader,[7] more or less upon the basis of de Wecker's method, made the corneal puncture and counterpuncture as near as possible to the insertion of the iris, but tried to leave a large bridge of conjunctiva reaching across the scleral incision, dividing an extent of sclera

equal to nearly a third of the circumference of the cornea.

In Graefe's own brief though brilliant career (he died of tuberculosis at the age of 42 years), his use of iridectomy for acute glaucoma was rather vigorously condemned by eye surgeons of great eminence, men who are given high praise whenever the history of ophthalmology in the second half of the 19th century is under discussion. *The Medical Times and Gazette* of London, England, for many years an outstanding example of medical journalism of the 19th century, contained, in 1858, as many as eight original papers dealing with iridectomy. In the first of these, by Hulke[8] of King's College Hospital, reference is made to a fact which today sounds strange, namely that Graefe at first tried atropine in the treatment of acute glaucoma, for which locally the previous operative treatment had practically been limited to paracentesis of the anterior chamber. Although iridectomy was welcomed enthusiastically by Hulke,[8] Bowman,[9] and Critchett,[9] two other surgical writers, whose names are still familiar to many of us, questioned both Graefe's ability as an ophthalmologist and the efficacy of the operation for glaucoma. These were T. Wharton Jones, professor of ophthalmic medicine and surgery in University College, London, and William Mackenzie, surgeon-oculist to Queen Victoria and lecturer on the eye in the University of Glasgow. Jones and Mackenzie[10] condemned Graefe's practice of iridectomy as "opposed to the plainest principles of surgery and common sense," and they had no doubt that in a short time iridectomy as a means of treating glaucoma would be abandoned in favor of "the practice . . . of more frequently puncturing the cornea and sclerotica in this disease."

In the same medical journal Graefe[11] took up the cudgels in his own defense, remarking that he had doubted "whether the article merited an answer or not, for the esteemed authors confess that they are without any personal experience on the questionable point," but he undertook a reply "as a tribute . . . to their earlier merits." He pointed out that the inadequacy of paracentesis had been clearly demonstrated for years in his own large practice. In conclusion he says "I willingly pardon older, and so highly deserving men, for their want of that elasticity requisite for the immediate reception of new views; . . . but I should indeed have expected more moderation from the Nestor of English ophthalmology."

A fact which seems worth mentioning here, although perhaps of picturesque rather than practical significance, is that in 1874 that famous Scot, D. Argyll Robertson,[12] published a paper under the title "Trephining the sclerotic—a new operation for glaucoma." Argyll Robertson thought that the increase of tension was due in some cases to increased secretion of vitreous humor, in others to serous transudation into the chamber of the vitreous humor. He expressed the opinion that all measures undertaken for the cure of the disease should have for their object the reduction of the intraocular pressure. He had therefore undertaken to drill a circular aperture through the sclerotic at or about the junction of the ciliary processes with the choroid, "so as to avoid as far as possible the more anterior parts of the ciliary processes." The instrument used was the "corneal trephine devised by Mr. Bowman for operating on cases of conical cornea," or subsequently a modification of this instrument which Argyll Robertson himself devised. The operation had been used on only four eyes, in very advanced glaucomatous condition. The results were inconclusive.

The most striking period of development in the surgery of chronic glaucoma appears to have been the first decade of the present century, although of course much preliminary investigation went on before the resulting publications appeared in the literature.

Herbert's subconjunctival fistula

As early as 1903, writing under the title of "Subconjunctival fistula formation in the

treatment of primary chronic glaucoma," Herbert[13] remarked that in a large proportion of the eyes operated upon in his work in India, typical iridectomy failed to relieve tension or even destroyed sight through various complications. In his own work, as well as that of other operators, success was much more generally obtained when the iris had by chance healed in the wound. He had also observed that proplapse of the iris following cataract extraction, when not covered by conjunctiva, was often associated with iritis from the beginning, whereas a similar prolapse, mainly or entirely covered by a conjunctival flap, did not exhibit this tendency, and he added that the evil repute of cystoid cicatrices in rendering eyes permanently liable to infection had been earned mainly, at any rate in the cases following cataract extraction, by prolapses and incarcerations which were left partly or completely uncovered by conjunctiva. It was this line of observation and reasoning which had caused him to leave prolapsed iris—in nearly all cases purposely—in 130 operations for primary glaucoma. The relief of tension provided by a fistulous cicatrix appeared, he said, to be certain and permanent. Herbert concluded that the perspective in our views upon the operative treatment of chronic glaucoma needed correction, and that too much had been made of the fear of late infection, and too little of the fact that fistulous scars provided the only certain means of permanently relieving some cases of glaucoma.

Holth's iridencleisis

A model of clear thinking and patient observation is contained in the communication read by Holth[14] before the Medical Society of Christiania (now Oslo), on September 26, 1906, and which was also presented in condensed form in the same year to the French Ophthalmological Society and to the meeting of the German Ophthalmological Society in Heidelberg, and was published in full (in French translation) in *Annales d'Oculistique,* May, 1907. It is proper to regard this paper as one of the classics of ophthalmic literature, by virtue of its logical study of scientific facts and the clarity of its argument.

Except as to iridectomy, proposed by Graefe for the relief of glaucoma 50 years earlier, previous operations for glaucoma had aimed to establish a new channel of drainage of aqueous humor by excision of sclera beneath a conjunctival flap. Holth's operation, generally speaking, excised no tissue; and it depended for success upon the formation of a new drainage channel associated with incarceration of the pigmented iris between the lips of the scleral wound.

It is necessary to keep in mind how important a step in the study of the glaucoma problem, for now nearly a half century, has been the successful tonometer of Schiötz, another Christiania leader. Holth tested with the tonometer a series of glaucomatous eyes which had been subjected to iridectomy. Except within the first few weeks after the operation, he found the intraocular pressure generally above normal. Strangely enough, and in spite of the dread of iris prolapse as a dangerous complication following any intraocular operation, Holth discovered that the iridectomized eyes which had been relieved of their hypertension were usually eyes in which the technique of the operation had in the first instance been regarded as defective, because iris tissue had been left in the scleral wound.

Holth therefore made an intentional experiment upon the two equally hypertensive eyes of a single patient, doing an ordinary iridectomy upon the blind eye, and upon the other eye an iridectomy with incarceration of the iris beneath the conjunctival flap. The tension had previously been 54 mm. in each eye. In the former eye the tension fell to 43 mm., and in the latter to 24 mm. Holth further compared other cases in which iridectomy had been complicated by accidental incarceration of the iris with those cases in which the iridectomy had been classically

performed, and this further study supported his conclusion that the subconjunctival incarceration was beneficial instead of harmful. In a number of cases, therefore, Holth proceeded to perform iridectomy with intentional incarceration, and the paper which he read before the Christiania Society in 1906 reported a goodly series of excellent results from such procedure.

It is only natural that the technique of iridencleisis has undergone modifications at the hands of various surgeons. Holth himself preferred a keratome incision, picking up an 8- or 10-mm. conjunctival flap, pushing the keratome along the sclera to within a millimeter of the limbus, and then drawing the iris sphincter into the scleral wound and making a meridional cut to one side of the forceps. Other surgeons have made the incision with the Graefe knife, although Holth himself had tried this method and did not favor it. Other operators have dissected a conjunctival flap from the limbus peripherally, making use, that is, of a Van Lint flap. Some have performed the usual type of iridectomy, but have left iris tissue in each angle of the scleral wound. Others, for example Greenwood,[15] have combined iris incarceration with excision of sclera as recommended by Lagrange.

Borthen,[16] also a Norwegian (practicing at Bergen), after performing a number of operations more or less according to the technique of Holth, raised the question whether it was necessary to cut the iris sphincter. He therefore proceeded to modify Holth's technique by merely seizing the iris sphincter and drawing it out under the conjunctival flap, but without cutting it; and he had excellent results with this modification.

From many sides the proposal to leave iris tissue outside the eyeball was criticized as in conflict with sound surgical principle. From a large mass of statistical material, however, it seems probable that iris tissue remaining between the sclera and a thick conjunctival flap does not endanger the eye. Where the operation is performed according to this principle, postoperative reaction is almost nonexistent in the vast majority of cases. However, an excellent example of this not unnatural prejudice against iridencleisis is the fact that throughout several editions Meller's well-known *Ophthalmic Surgery* refrained from even mentioning Holth's operation.

Herbert's "wedge isolation" and Lagrange's "sclero-iridectomy"

Also in the first decade of this century, Herbert[17] continued and Lagrange[18] began to urge the desirability of creating a filtration scar, and both aimed to accomplish this by excision of a strip of sclera. Herbert and Lagrange both associated the scleral excision with iridectomy. Herbert's procedure was entitled the "wedge-isolation" operation, while Lagrange used the name "sclero-iridectomy." The Lagrange operation was described by the author as consisting of three steps: (1) Puncture and counterpuncture one millimeter from the limbus, the knife emerging at the iridocorneal angle; turning the cutting edge of the knife backward during emergence from the sclera, so as to cut the sclera obliquely in the shape of the mouthpiece of a flute; and continuing the knife beneath the conjunctiva so as to cut a large conjunctival flap, such as had been made by Graefe in his linear extraction. (2) Lifting the conjunctival flap with fine mouse-tooth forceps and with sharp scissors resecting a fairly large fragment of the anterior lip of the scleral incision, without damage to the conjunctival flap. (3) Iridectomy in the usual manner and replacement of the conjunctival flap.

While it was the general tendency to decry incarceration of the iris in the lips of the wound, as occurred in the procedure which was frankly recommended and advantageously employed by Holth, it is probable that more or less incarceration of the iris occurred in many of the successful results obtained by various methods.

In 1909, writing from the Clinic of Ernst Fuchs in Vienna, Meller[19] was able to discuss the interpretation of 27 cases with regard to the effectivenes of Lagrange's operation. His 51-page review led him to the conclusions that the action of sclerectomy differed from that of iridectomy, and that sclerectomy created a safety valve which protected against an excess of intraocular fluid, but that it was undecided whether the question of the pathology of glaucoma coincided with the question of a filtering scar; and finally that there was distinct evidence that the most dangerous symptom of glaucoma, namely hypertension, could be relieved by this operation without danger for the eye and that the operation should therefore be included among the surgical armamentarium of the ophthalmologist, for use in appropriate cases.

Another essay by Meller,[20] based upon microscopic study of 11 eyes enucleated for various reasons after the Lagrange operation, reported that in cases in which the uveal tissue had remained in its normal position, and had not become caught in the wound, the process of repair of the scleral wound proceeded with great rapidity, and led to the formation of dense and entirely impermeable tissue; but that when the iris prolapsed between the lips of the scleral incision the sclera did not share in the process of repair, which was undertaken in part by the subconjunctival tissue.

Heine's cyclodialysis

The proposal made by Heine[21] for treatment of chronic glaucoma by means of the operation to which he at once attached, and which has continued to be known by, the name of "cyclodialysis," approached the problem from a point of view which had little or nothing to do with Graefe's operation of iridectomy. In his short but well-reasoned contribution, the author, then Privat-Dozent and First Assistant at Uhthoff's Clinic in Breslau, recalled Graefe's early misconception of glaucoma as depending entirely upon hypersecretion of fluid within the eye, and de Wecker's later replacement of this idea with the conception that glaucoma was due not to hypersecretion but to inadequacy of drainage. (This change of outlook had an important bearing upon subsequent discussion as to the general topic of secretion and drainage of the aqueous.) In 1876, Knies and Weber (quoted by Heine) had demonstrated displacement of the chamber angle in many cases of glaucoma, and the idea of liberating the angle assumed dominance. Related to this physiologic concept is the supposed favorable influence of near work upon the glaucomatous eye. In 1900 Fuchs (quoted by Heine) had shown for the first time the frequency with which detachment of the choroid occurred after ordinary cataract extraction, and Axenfeld (quoted by Heine) proceeded to call attention to the same phenomenon occurring after sclerectomy or incision at the chamber angle as well as after iridectomy. The latter author raised the question whether such choroidal detachment had anything to do with the curative effect of iridectomy in glaucoma. Fuchs's interpretation of the process by which choroidal detachment occurred in such cases was that under the influence of traction on the eyeball during passage of the keratome or knife through the ocular tissues the pectinate ligament became torn, so that the aqueous humor was able to flow through the tear into the suprachoroidal space. Demaria (quoted by Heine) gave histologic demonstration of such a tear having occurred after iridectomy for glaucoma.

Heine was therefore induced to try experimentally whether communication established artificially between the anterior chamber and the suprachoroidal space had a definitely decompressive influence. This he did in blind human eyes, after studying the operation on the pig's eye. Heine's original operation consisted of making a small subconjunctival incision through the sclera 4 or 5 mm. from the limbus, and then carrying a lens repositor or similar instrument

beneath and close to the sclera, through the pectinate ligament, and into the anterior chamber, and sweeping this instrument 2 or 3 mm. upward and downward so as to separate the ciliary body from the sclera. In his first description Heine spoke of allowing little or no aqueous humor to flow out through the scleral wound, and he indicated that immediately after the operation the tension was unaltered, and that only two or three days later did reduction of tension occur. At the time of publishing the original article, Heine had performed the operation only on blind or almost blind eyes.

Meller[22] wrote from the Fuchs Clinic with regard to the benefit to be derived from cyclodialysis, which had been employed in 42 cases. He declared that, while cyclodialysis could be successfully employed to reduce the tension in primary glaucoma, the operation was not to be regarded as of nearly equal value with iridectomy, since cyclodialysis was in many cases followed by relapse.

Papers evaluating and criticizing the various operations have naturally been extremely numerous, and few of them can be mentioned here. With regard to cyclodialysis, much valuable discussion was contributed by Elschnig, whose mature judgment with regard to cyclodialysis, after ample experience, was expressed in 1909[23] with an analysis of 20 cases in which the operation had been performed. Admitting that the essential factor in the working of this operation was not clearly understood, he declared that this consideration did not increase or decrease the value of cyclodialysis. He reminded his readers that the iridectomy operation had been performed for glaucoma without any satisfactory explanation of its effect having been established. He regarded cyclodialysis as superior to iridectomy in the treatment of compensated glaucoma, and as especially valuable in its freedom from harmful effect upon the eye.

Many surgeons have attributed to cyclodialysis the distinct advantage that it may be performed in an eye in which iridectomy or one of the filtration methods has already been used unsuccessfully. The same is to some extent true of the filtration operations as regards a previously performed and unsuccessful, or only partially successful, iridectomy. The present writer has several times done an iridencleisis operation, although using incarceration without incision of the iris, in an eye which had had a classical iridectomy long previously. One edge of the iris coloboma was picked up and incarcerated in a small scleral incision. The results were excellent. It must be admitted, however, that these were cases in which the original iridectomy had been performed apparently without a conjunctival flap, so that there was no disturbing amount of subconjunctival scar tissue.

Like other modern glaucoma operations, cyclodialysis has had its critics as well as its enthusiastic advocates. The chief objection to it, by many writers, has been that its action was not sufficiently lasting. Many surgeons now perform the operation so as to separate a much larger part of the ciliary body than was at first proposed by Heine. Torres Estrada[24] (Mexico City), who is strongly opposed to any form of fistulizing operation at the limbus, almost always performs the operation which he calls "hemicyclodialysis," in which approximately one half of the ciliary body is separated from its adhesion to the sclera.

Elliot's trephining operation

In 1909, Elliot,[25] then superintendent of the great Government Ophthalmic Hospital at Madras, India (where he had succeeded to Herbert), put forward his preliminary note on the establishment of a filtering cicatrix by means of a trephine opening at the sclerocorneal junction. Elliot had performed both Herbert's and Lagrange's operation a number of times, and had satisfied himself of the soundness of the contentions of these authors (1) that it was possible to form a permanent filtering cicatrix between the anterior chamber and the subconjunctival

space, and (2) that the permanent establishment of such a condition did reduce elevated intraocular pressure. But he criticized Herbert's operation as too complicated, and regarded Lagrange's operation as presenting excessive risk, in that the scleral section had to be made on an opened eye and often on an inflamed eye, it being difficult in these circumstances to graduate the exact amount of scleral tissue removed or to avoid escape of vitreous.

Elliot insisted on the importance of working beneath a triangular conjunctival flap, curetting thoroughly down beneath all episcleral tissue, and setting the guard of the 2-mm. trephine at such a depth as just to allow penetration of the sclera, cutting the trephined disc out slowly. Iridectomy had been performed in 21 out of 50 cases, usually only a tiny peripheral button of iris being removed. The chief danger to be avoided was that of making the trephine hole so far out as to tap the suprachoroidal space instead of the anterior chamber. It was therefore essential to "hug the limbus."

A later paper by Elliot[26] emphasized certain technical details of the trephining operation, in the light of experience in teaching its technique to 15 surgeons at the Government Ophthalmic Hospital, Madras, in a total of 400 cases. The principal points mentioned were that in a troublesome patient who looked obstinately upward, especially during performance of the operation on the second eye, it was often a great convenience to do the trephining below; that an upward flap rarely required a stitch, whereas a flap made downward more often required a suture; that a large flap had been found a great safeguard against infection of the eye and less likely to produce marked astigmatism, as well as favoring free filtration. Later conjunctival flaps had been made without carrying the incision completely to the limbus at either end, as this permitted filtration to occur into the subconjunctival space outside the limits of the incision.

Controversy as to the relative value and safety of the different filtration operations has given particular attention to the danger of producing sympathetic ophthalmia. Allowing for the influence of slight variations in individual technique in producing such a complication, the literature does not substantially support the belief that this danger exists in greater degree in one filtration operation than in another, and it may be considered that iridencleisis, the Lagrange operation, and Elliot's trephining are approximately of equal safety in this regard, while cyclodialysis may perhaps be slightly freer from such a risk. In the hands of the average surgeon, there appears to have been an appreciably greater frequency of recurrent hypertension after cyclodialysis than after the fistulizing operations. On the other hand, cyclodialysis has some advantage as to the possibility of its being repeated after failure from a first attempt.

As regards the surgical and historical status of the Lagrange as compared with the Elliot operation, Rochon Duvigneaud[27] has rather epigrammatically summed up the matter by saying that Elliot's trephining technique is "the best means of executing the Lagrange operation."

Combination of several surgical procedures has frequently been advocated. Cyclodialysis has at times been modified by inclusion of uveal tissue in the operative wound; and Sallmann[28] performed in a considerable number of cases a modified form of cyclodialysis in which preliminary incision of the sclera with the lance keratome was replaced by scleral trephining.

An interesting example of the variations in opinion which keen and catholic minds are apt to experience in the course of years is the fact that Wilmer[29] of the Johns Hopkins Clinic, speaking some 20 years ago at the Oxford Congress, said that he had shrunk from performing the iridencleisis operation because of the possibility of sympathetic ophthalmia and the danger of detached retina occurring much later; although in after years he became a definite

advocate of the iridencleisis operation. Such experiences suggest that it would be an instructive field of investigation to discover how largely choice of surgical technique depends upon geography, and upon the extent to which the worker has come under the influence of a given surgical leader and his writings.

Subject to the limitations still imposed, although in diminishing degree, by time and space, science knows no national boundaries.* The progress of research concerning surgical procedures against glaucoma is one more example of this agreeable and stimulating truth. Side by side, the medical scientists of many countries have moved forward in the utilization of reason and empiricism toward a common goal, the prevention and relief of blindness.

The enormous problem still presented clinically by glaucoma has been materially advanced by the various filtration operations and by cyclodialysis, and many patients to whom, in spite of the long record established by iridectomy, blindness would have been inevitable a half century ago, are now afforded complete relief from the further progress of this disease.†

227 Sixteenth Street.

* The political implications of modern knowledge concerning atomic structure tend to contradict this age-long principle, and threaten to set bounds to intercommunication between the scientists of different nations, thus actually retarding scientific progress.

† The title of this paper is probably sufficient explanation for the author's failure to mention either Otto Barkan's procedure or the diathermy operation.

References

1. Graefe, Albrecht: Concerning iridectomy in glaucoma and concerning the glaucomatous process. Arch. f. Ophth., **3**:456 (pt. 2) 1857.
2. Schweinitz, G. E. de: Diseases of the Eye. Philadelphia and London, W. B. Saunders Company, 6th ed., 1910.
3. Posey, Wm. C.: Article on "Glaucoma." Am. Encycl. Ophth., **7**:5488.
4. Wecker, de: Traité des maladies des yeux, 1867. Quoted in Am. Encycl. Ophth., **7**:5481.
5. Panas, F.: L'irido-sclérotomie. Arch. d'Opht., **4**:481, 1884. Quoted in Am. Encycl. Ophth., **7**:5482.
6. Wecker, Louis de: Quaglino et sa sclérotomie. Ann. d'Ocul., **111**:321, 1894. Quoted in Am. Encycl. Ophth., **7**:5485.
7. Bader, C.: Sclerotomy versus iridectomy. Royal London Ophth. Hosp. Rep., **8**:430, 1876. Quoted in Am. Encycl. Ophth., **7**:5483.
8. Hulke, J. W.: Surgical treatment of glaucoma. Med. Times and Gazette, **16**:100 and 316, 1858.
9. Bowman; Critchett: (Discussion of Hulke's paper.) Med. Times and Gazette, **16**:100 and 101, 1858.
10. Jones, T.W., and Mackenzie, W.: Operation of iridectomy or excision of piece of iris. Med. Times and Gazette, 1858, **16**:342, 1858.
11. Graefe, Albrecht: On iridectomy in iritis, iridochoroiditis, and glaucoma. Med. Times and Gazette, **16**:447, 1858.
12. Argyll Robertson, D.: Trephining the sclerotic—a new operation for glaucoma. Royal London Ophth. Hosp. Rep., **8**:404, 1874-76.
13. Herbert, H.: Subconjunctival fistula formation in the treatment of primary chronic glaucoma. Tr. Ophth. Soc. U. Kingdom, **23**:324, 1903.
14. Holth, S.: Iridencleisis antiglaucomatosa. Ann. d'Ocul., **137**:345, 1907.
15. Greenwood, Allen: Combined iridencleisis and sclerectomy for chronic glaucoma. Am. J. Ophth., **13**:301, 1930.
16. Borthen, Johan: Operative Glaucombehandlung. Arch. f. Augenh., **65**:42, 1910.
17. Herbert, H.: Filtering cicatrix for glaucoma. Ophthalmoscope, **5**:292, 1907.
18. Lagrange, F.: Combined iridectomy and sclerotomy for glaucoma. Ann. d'Ocul., **137**:89, 1907.
———: Production of cicatrix in chronic glaucoma. Ophthalmoscope, **5**:467, 1907.
19. Meller, J.: Ueber die Sklerekto-Iridektomie. Klin. M. f. Augenh., **2**:641, 1909.
20. ———: Ueber die Sklerektomie nach Lagrange und die Trepanation nach Elliot. Klin. M. f. Augenh., **52**:1, 1914.
21. Heine: Die Cyklodialyse, eine neue Glaukomoperation. Deutsche med. Wchnschr., **31**:824, 1905.
22. Meller, J.: Die Cyklodialyse und ihr Einfluss auf die intraokulare Drucksteigerung. Arch. f. Ophth., **67**:476, 1908.
23. Elschnig, A.: Ueber die Zyklodialyse. Klin. M. f. Augenh., **48**: (Supplement) 1910.

24. Torres Estrada, Antonio: La hemiciclodiálisis es una operación que restablece la derivación fisiologica de los líquidos intraoculares. Bol. del Hosp. Oft. de Nuestra Señora de la Luz, **3**:121, 1946.
25. Elliot, R. H.: A preliminary note on a new operative procedure for the establishment of a filtering cicatrix in the treatment of glaucoma. Ophthalmoscope, **7**:804, 1909.
26. Elliot, R. H.: Some technical details of the operation of simple trephining. Tr. Ophth. Soc. U. Kingdom, **31**:230, 1911.
27. Rochon-Duvigneaud and Besnard: L'irido-sclérectomie par la trépanation cornéo-sclérale d'Elliot. Ses résultats dans les diverses formes de glaucoma. Ann. d'Ocul., **159**:81, 1922.
28. Sallmann: Die Trepanationszyklodialyse, eine Abänderung der Heineschen Zyklodialysenoperation. Ztschr. f. Augenh., **86**:111, 1935.
29. Wilmer, W. H.: Discussion on the results of the operative treatment of glaucoma. Tr. Ophth. Soc. U. Kingdom, **47**:230, 1927.

RETINAL DETACHMENT*

A SURVEY OF THE ETIOLOGY AND RESULTS OF TREATMENTS ON PHAKICS AND APHAKICS

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The basis of all modern perforating diathermy treatment of retinal detachment is Gonin's historic cautery puncture in 1916 when he attempted by one procedure to evacuate the subretinal fluid, seal off the hole, and cause adhesive choroiditis to hold the retina in place. This was followed by the Guist-Lindner method of multiple trephines with chemical cauterization of the choroid, claiming two advances: namely, a greater possibility of sealing off the hole, and eliminating the possibility of choroidal hemorrhage. The next major step forward was the insertion of Safar or Walker pins by means of diathermy current, whereby more accurate sealing off of the holes and better control of the degree of reaction was accomplished. Numerous modifications of this technique have followed, largely consisting of new types of pins or needles and variations in the technique of application.

The present study was undertaken (1) to compare the various etiologic factors in the production of retinal detachments in phakic and aphakic eyes; (2) to determine the preoperative clinical findings which influence the operative result so cases may be divided into favorable and unfavorable regarding prognosis; and, (3) to compare the results of various operative techniques.

MATERIAL

The material on which this survey is based consists of 304 consecutive cases of retinal detachments operated upon in the Wilmer Ophthalmological Institute between 1927 and 1944. There were 246 phakic eyes and 58 aphakic eyes.

TABLE 1

AGE INCIDENCE IN RETINAL DETACHMENTS

Age	Phakic		Aphakic	
	Number and Percentage of Cases		Number and Percentage of Cases	
	Number	Percentage	Number	Percentage
Under 10	3	1.2	1	1.7
10 to 19	18	8.2	0	0
20 to 29	31	12.7	7	12.1
30 to 39	33	13.5	6	10.3
40 to 49	55	22.4	6	10.3
50 to 59	54	22.0	16	27.6
60 to 69	45	14.3	17	29.3
70 to 79	6	2.4	5	8.6

The age incidence for retinal detachments shows a small rise to a maximum between the ages of 40 and 60 years (table 1). Only 11 Negroes were operated upon, and a slight

* From the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital.

TABLE 1A

RACE AND SEX IN RETINAL DETACHMENTS

	Phakic	Aphakic
	Percentage of Cases	Percentage of Cases
White male	55.7	65.5
White female	39.8	24.2
Colored male	3.9	6.9
Colored female	0.8	3.4

preponderance of males over females was found (table 1A).

This series includes all cases both favorable and unfavorable operated upon between these dates. Sixty-eight patients had detachments of at least three quadrants; 25 had detachments of the entire retina; and in 53 patients the duration of the detachment was over six months before operation. Most of such cases were operated upon with full realization that prognosis was extremely poor but that, nevertheless, the patient was entitled to his "day in court." As will hereafter be pointed out, various operative techniques were employed in these patients, the technique varying as advances were made in our knowledge of the treatment of retinal detachment.

COMPARISON OF THE ETIOLOGIC FACTORS IN PHAKICS AND APHAKICS

The importance of myopia in the etiology of idiopathic detachment of the retina has been well established by many observers, including Phelps,[1] Borley,[2] McKeown,[3] and Holst,[4] who found a slight majority of such cases was myopic. In this series 40 percent of the phakic detachments were myopic, but myopia did not seem to be a significant factor in the aphakic detachments (table 2).

TABLE 2

INCIDENCE OF REFRACTIVE ERROR IN PHAKIC DETACHMENTS

Refraction	Percentage of Cases
Emmetropic	41.7
Myopic 1 to 3 D.	11.5
Myopic 4 to 9 D.	16.6
Myopic 10 D. and over	6.9
"Nearsighted"—unknown refraction	4.6
Total myopics	39.6
Hyperopic	18.8

Degenerative changes in the vitreous with the formation of floating opacities and traction bands have been considered by many to be a potent factor in the etiology of simple retinal detachments of both phakic and aphakic eyes. In the present series vitreous opacities were found to be more prevalent in phakic than aphakic eyes, (45.5 percent vs. 10.3 percent). The etiologic importance of disturbances of vitreous structure during extraction of a cataract has been emphasized by many observers. Johnson[5] declared that it is not the loss of a small amount of vitreous that does the real damage, but changes set up through disturbance of the vitreous structure. Shapland,[6] studying 651 cases of retinal detachment in the United Kingdom from 1930 to 1933, also noted the importance of vitreous disturbance. He expressed the theory that vitreous becomes incarcerated in the section and contracts as healing takes place, drawing the retina upward, thus forming a detachment in the lower half of the fundus. He remarked that 10 percent represents with fair accuracy the proportion of retinal detachments occurring in aphakic subjects. Hughes and Owens,[7] in a paper including many of the cases studied here, found that the degree of vitreous

TABLE 3

RELATION OF VITREOUS LOSS TO THE DEVELOPMENT OF POSTOPERATIVE RETINAL DETACHMENT AFTER CATARACT EXTRACTION*

Loss of Vitreous	Number of Cases	Percentage of Retinal Detachment
None	1,720	0.9
Presentation	154	1.3
Moderate	141	5.7
Severe	46	10.9

* Table from article by Hughes and Owens.[7]

loss at the time of the cataract extraction was directly related to the incidence of postoperative simple detachment of the retina (table 3). No difference was found between the intracapsular and extracapsular extractions in respect to this complication. Associated with increased vitreous loss were persistent vitreous opacities, due partly to vitreous hemorrhage and probably in part to disorganization of the normal vitreous structure.

The onset of simple detachments after cataract extraction was longer than six months postoperatively in 55 percent of the cases and longer than two years in 36 percent. This relatively late onset after the extraction of the cataract suggests that degenerative changes in the vitreous were probably taking place in the intervening period. (table 4).

Trauma is somewhat more common in phakic eyes than in aphakic eyes (table 5).

Retinal perforations in aphakics were observed more infrequently than in phakics (table 6). Jeandelize, Bandot, and Gault[8] showed that, in myopia, the degeneration frequently takes the form of peripheral choroiditis with defective vitreous. Vogt considered that cystic degeneration of the retina was one of the most important single factors in retinal separations. In the present series the incidence of degenerative changes in the eye was somewhat more frequent in phakics than in aphakics (table 6). This evidence lends some support to the views quoted above, that degenerative changes in the retina precede retinal perforations and subsequent detachments—an etiologic factor which appears in this series to be more important in phakic eyes.

Practically no cases with undisputed evidence of uveitis are included in this series of operative cases. The discouraging prognosis of detachments associated with uveitis and glial bands in the vitreous is well known. However, 5 percent of the phakic and 10 percent of the aphakic cases had a positive aqueous ray at the time of operation. The operative prognosis appears to be greatly affected by the presence of a positive aqueous

TABLE 4

TIME OF ONSET OF RETINAL DETACHMENT FOLLOWING CATARACT EXTRACTION

Onset after Cataract Extraction	Number of Cases	Percentage of Cases
Less than 2 weeks	4	6.9
2 weeks to 2 months	6	10.3
3 to 6 months	16	27.6
7 to 12 months	1	1.7
1 to 2 years	10	17.2
2 to 5 years	7	12.1
5 to 10 years	3	5.2
Over 10 years	11	18.9

TABLE 5

INCIDENCE OF TRAUMA IN INDIVIDUALS DEVELOPING RETINAL DETACHMENT

	Number of Cases	No Trauma (Percentage)	Indirect to Body (Percentage)	Indirect to Head (Percentage)	Direct To Eye (Percentage)
Phakics	246	79.5	3.7	6.9	9.8
Aphakics	58	87.9	1.7	5.2	3.4

TABLE 6

INCIDENCE OF RETINAL PERFORATIONS AND DEGENERATION IN DETACHMENTS

	Number of Cases	Retinal Perforations (Percentage)	Cystic Degeneration (Percentage)	Myopic Degeneration (Percentage)
Phakics	246	61.8	11.0	6.9
Aphakics	58	38.4	5.2	0

flare, suggesting that this sign may indicate more serious retinal or vitreous pathology.

Preoperative clinical findings determining favorable and unfavorable prognosis

1. Age. In phakics, a significantly poorer prognosis for obtaining mechanical reattachment of the retina after operation occurred after the age of 60 years (table 7). Of 51 cases in the older age group, only 35 percent obtained reattachment in comparison to 60 percent of 191 cases between the ages of 10 and 60 years. No significant difference was found in the results of operation in various age groups of aphakics.

2. Refraction. Myopia, listed high as a contributory cause of retinal detachment, also rated as a factor against operative recovery (table 8). Excluding those eyes of uncertain refraction, designated as "nearsighted," increasing amounts of myopia were directly related to progressively poorer operative results. Hyperopia of over one diopter also appeared to influence adversely the reattachment of the retina. In line with these findings, Phelps[1] cured only 21 percent of those cases in which the myopia was 15

TABLE 7

Importance of age, race, and sex on the operative prognosis of retinal detachments

Age	Phakic			Aphakic		
	Number of Cases	Number and Percentage Reattached		Number of Cases	Number and Percentage Reattached	
		Number	Percentage		Number	Percentage
Under 10	3	1	33.3	1	0	0
10 to 19	18	13	72.2	0	0	0
20 to 29	31	18	54.8	7	2	28.6
30 to 39	33	15	45.5	6	1	16.7
40 to 49	55	26	47.3	6	1	16.7
50 to 59	54	34	62.9	16	8	50.0
60 to 69	45	17	37.8	17	6	35.3
70 to 79	6	1	16.7	5	2	40.0
Total	245	125	51.0	58	20	34.5
Race and sex	Number of Cases	Percentage Reattached		Number of Cases	Percentage Reattached	
White male	137	51.8		38	31.6	
White female	98	52.0		14	30.0	
Colored male	9	22.2		4	0	
Colored female	2	0		2	50.0	

TABLE 8

Influence of refractive error on postoperative results in phakic detachments

Refraction	Number of Cases	Percentage Successful Reattachment	Average Follow-up (Months)
Emmetropic	91	61.5	25
Myopic 1 to 3 D.	25	56.0	26
Myopic 4 to 9 D.	36	44.4	22
Myopic 10 D. and over	15	26.7	18
"Nearsighted"—unknown refraction	10	70.0	17
All myopic (total)	86	47.7	22
Hyperopic	41	39.0	21

diopters or more. Holst,[4] reporting on a series of myopes and hyperopes with trauma, noted only 9 successes out of 19 operations. Samuels,[9] discussing retinal detachment in connection with iritis and glaucoma, added further that myopic eyes developed more complications, and more frequently had to be enucleated.

3. Aphakia. The literature on aphakic detachments is relatively scanty. Shapland[6] remarked, in 1934, of the scant reference in the literature to the disappointing operative results in aphakic detachments. He reported his results on 16 aphakic detachments as disappointing, with only three permanent successes. Gradle and Meyer,[10] reporting on 29 phakic eyes, announced

TABLE 9

INFLUENCE OF VITREOUS DISTURBANCES ON POSTOPERATIVE RESULTS

Aphakics Only	Number of Cases	Mechanically Successful (Percentage)
Vitreous loss at time of cataract extraction	12	16.7
No vitreous loss	40	37.5
Vitreous opacities	5	20.0
No vitreous opacities	53	35.8

cures for 13, while in discussing five aphakic cases, it was noted the percentage of "cures" was far less. The figures collected here showed 35 percent of 58 detachments in aphakic eyes were mechanically successful after operation, contrasting with 51 percent mechanically successful re-attachments in phakic eyes. The causes for discrepancy between the success to be expected after operation for detachment in phakia and aphakia are uncertain. In addition to the fact that the removal of the lens might weaken the supporting structure of the vitreous and retina, are other possible factors; such as, previous loss of vitreous, low-grade postoperative uveitis, and the fact that fewer retinal perforations were detected preoperatively and properly sealed off.

TABLE 10

INFLUENCE OF A POSITIVE AQUEOUS RAY ON POSTOPERATIVE RESULTS

Phakics	Number of Cases	Mechanically Successful (Percentage)
Positive aqueous ray	12	8.3
Negative aqueous ray	231	52.3
Aphakics (at time of detachment operation)		
Positive aqueous ray	6	33.3
Negative aqueous ray	52	34.6

4. Vitreous Disturbances. In aphakics, vitreous loss at the time of the previous cataract extraction and persistent vitreous opacities have a suggestively detrimental effect against subsequent reattachment by operation (table 9).

5. Positive Aqueous Ray. There is no information in the literature on the influence of a positive aqueous ray on successful reattachment by operation. In phakic eyes with positive aqueous ray, there were 11 failures out of 12 operative attempts, sharply contrasting with 52 percent of successful reattachments in 231 cases with a negative aqueous ray (table 10). Such a relationship does not hold in the smaller number of aphakics.

6. Duration of Detachment Before Operation. The time interval between detachment and operation vitally affects the prognosis. This was strikingly illustrated by Arrizonis[11] in Switzerland who recorded 74 percent success when less than three weeks had intervened between retinal separation and operation, whereas between three weeks and three months the ratio dropped to 53 percent; and after three months, only 6.7 percent of the retinas reattached. In the present series the importance of early operation is manifested most clearly in the aphakics where, after two months, only one reattachment in 11 attempts resulted, and in that patient the vision failed to improve (table 11). This contrasts significantly with 37-percent successful reattachments in 43 cases

operated within two months of the onset of the detachment, and visual improvement of at least two lines in the Snellen chart was exhibited in 28 percent. Delay in operations for detachment in phakics is apparently of less concern except for the danger of more extensive areas being involved.

7. Location of Detachment. A review of the literature shows that the great majority of detachments are in the temporal half, and a smaller preponderance is noted for the upper as against the lower half. It happens that in this series more detachments were observed in the lower than in the upper half, but as in other series they preponderate on the temporal side (table 12). It can be seen, at least in the case of phakics, that it makes little difference in the eventual result

TABLE 11

INFLUENCE OF DURATION OF DETACHMENT ON POSTOPERATIVE RESULTS

Duration of Detachment	Number of Cases	Mechanically Successful		Vision* (Percentage of Cases)		
		Number of Cases	Percentage of Cases	Improved	Same	Worse
Aphakics						
1 to 6 days	9	3	33.3	11.1	77.8	0
7 to 13 days	15	4	26.7	20.0	60.0	6.7
14 to 20 days	6	3	50.0	33.3	66.6	0
21 to 28 days	4	3	75.0	100.0	0	0
1 to 2 months	9	3	33.3	22.2	55.6	22.2
3 to 5 months	4	0	0	0	75.0	25.0
6 to 9 months	3	1	33.3	0	100.0	0
10 to 12 months	1	0	0	0	100.0	0
1 to 2 years	1	0	0	0	0	100.0
Over 2 years	2	0	0	0	100.0	0
Phakics						
1 to 6 days	13	7	53.8	15.4	53.8	15.4
7 to 13 days	35	21	60.0	40.0	45.7	8.6
14 to 20 days	22	13	59.0	36.4	50.0	13.6
21 to 28 days	24	11	45.8	37.5	45.8	12.5
1 to 2 months	74	36	48.7	32.4	54.1	9.5
3 to 5 months	29	14	48.2	27.8	51.7	13.8
6 to 9 months	17	9	52.9	29.4	51.8	17.6
10 to 12 months	9	3	33.3	22.2	44.4	33.3
1 to 2 years	13	7	53.8	30.8	46.2	23.1
Over 2 years	7	1	14.3	14.3	57.1	0

* Visual improvement or visual decrease refers to a difference of at least two lines on the Snellen chart between preoperative and postoperative vision.

TABLE 12

INFLUENCE OF LOCATION AND SIZE OF DETACHMENT ON POSTOPERATIVE RESULTS

Location	Phakics		Aphakics	
	Number of Cases	Mechanically Successful (Percentage)	Number of Cases	Mechanically Successful (Percentage)
Upper quarter or half	48	56.2	19	31.5
Lower quarter or half	88	54.5	24	20.8
Temporal half	40	62.5	6	66.6
Nasal half	7	0	3	66.6
Total detachment	21	23.8	4	25.0
At Least 40° Field Cut				
1 quadrant	24	75.0	5	20.0
2 quadrants	108	51.0	26	42.3
3 quadrants	48	45.8	20	25.0

whether the detachment is in the upper or lower half, but all of the seven cases with a detachment nasally were unsuccessful. However, 23.8-percent operative success was obtained in total detachments, necessarily including the nasal half. In the nine aphakics here noted there was no difference in operative results between temporal and nasal detachments. According to normal anticipation, the proportion of success in phakic eyes drops steadily with greater area of detachment, as detected by cuts in the visual field.

TABLE 13

INFLUENCE OF RETINAL PERFORATIONS ON POSTOPERATIVE RESULTS

Type and Number of Retinal Perforations	Phakics		Aphakics	
	Number of Cases	Mechanically Successful (Percentage)	Number of Cases	Mechanically Successful (Percentage)
None	94	40.4	34	23.5
1 Perforation	101	59.3	17	47.1
2 Perforations	14	57.1	1	0
3 or more perforations	7	42.9		
Disinsertion, less than 1 quadrant	17	47.1	4	75.0
Location of Perforation				
Upper temporal	64	53.1	9	66.6
Lower temporal	46	58.7	7	57.1
Upper nasal	14	71.4	3	66.6
Lower nasal	11	54.5	2	50.0
Macular hole	2	100.0	1	100.0

TABLE 14

IMPORTANCE OF PREOPERATIVE TENSION ON POSTOPERATIVE RESULTS

Tension	Phakics		Aphakics	
	Number of Cases	Mechanically Successful (Percentage)	Number of Cases	Mechanically Successful (Percentage)
Under 8 mm. Hg	4	0	0	0
8 to 13 mm.	7	42.9	3	0
14 to 19 mm.	27	48.1	4	0
Low to fingers	32	40.6	3	66.6
20 to 28 mm.	18	61.1	0	0
Normal to fingers	156	53.2	42	35.7
29 mm. and over	20	50.0	0	0

8. Retinal Perforations. Operative results were significantly poorer when no retinal perforation was found (table 13). This might be explained by the fact that a hole was present but undetected preoperatively, and the subsequent generalized barrage did not properly seal off the hole. Those cases in which the retina was disinserted from its attachment to the ciliary body compared favorably with those having retinal perforations. The location of the perforation had no effect on the operative result. Weve[12] remarked that a typical disinsertion at the ora serrata heals well when operated, and in support of his statement reported total success—100 cures in 100 cases.

9. Preoperative Tension. Increased tension is considered by some to be an important factor against operative success in detachment. So strongly does it militate against cure, said Deutschman quoted by Schauren,[13] that he considered a tear in the retina as actually favorable for healing because it

reduces tension. This conclusion is not corroborated by our findings, there being a 50-percent operative success in patients in whom the preoperative tension was 29 mm. Hg (Schiøtz) or over (table 14).

10. Retinal Elevation at Time of Operation. Although statistical tabulation is lacking in the literature on this point, some authors have tacitly assumed that the greater the retinal elevation at the time of operation the less the chance of recovery. The findings in this series show no difference in this respect (table 15). It may be concluded that a wide gap between retina and choroid is no insuperable barrier to success. In this connection it may be interesting to recall a remarkable cure made by Weve in Utrecht, reported by Zorab,[14] of total detachment of such an extreme nature that most of the retina was actually folded over so that its posterior surface was facing anteriorly. Complete reattachment followed operation.

TABLE 15

EFFECT OF HEIGHT OF RETINAL ELEVATION IMMEDIATELY BEFORE OPERATION ON POSTOPERATIVE RESULTS

Retinal Elevation (Diopters)	Phakics		Aphakics	
	Number of Cases	Mechanically Successful (Percentage)	Number of Cases	Mechanically Successful (Percentage)
0	3	66.7	0	0
1 to 3	8	37.5	3	66.6
4 to 6	35	48.6	6	0
7 to 10	71	54.9	3	33.3
11 to 14	34	47.1	6	66.6
Over 14	37	37.8	8	12.5

Summary. From the above data which correlates preoperative clinical findings with successful reattachment of the retina after operation, it is possible to enumerate those factors which had the most effect on ultimate prognosis in this series in such a way that potentially unfavorable cases can be defined preoperatively as those which had the following characteristics: (a) Phakics—total detachment of the retina, positive aqueous ray, myopia over 10 diopters, and patients over 70 years of age. (b) Aphakics—over two months' duration of detachment before operation, and total detachment. Accordingly the cases have been classified as favorable and unfavorable in Table 16. Such a classification of cases makes an appreciable difference in the results to be expected from operation.

TABLE 16

RELATIVE RESULTS IN FAVORABLE AND UNFAVORABLE CASES

Type of Case	Number of Cases	Mechanically Successful Reattachments	
		Number	Percentage
Phakia—favorable	200	113	56.5
Phakia—unfavorable	46	11	24.0
Aphakia—favorable	45	18	40.0
Aphakia—unfavorable	13	2	15.4

COMPARISON AND EVALUATION OF THE RESULTS OF VARIOUS OPERATIVE TECHNIQUES

1. Year of Operation. Table 17 shows the steady and gratifying improvement made over the years in operation for retinal detachment. Also worthy of note is the contrast in number of cases operated; 31 in the first 7 years as against 215 for the last 11 years. Expansion of hospital facilities does not account for the increased number, and there is no reason to suppose that retinal detachment is any more prevalent now than it was 15 years ago. The answer is that

increasingly good results obtained have brought with them more hope of success, and as a result, many an operation is advised now that would not have been recommended in the not-so-distant past.

2. Type of Operation. Table 18 affords in itself a brief history of the results of various operative techniques for retinal detachment both in phakics and aphakics. In the early pioneer stage, Gonin's operation is the only one having any prospect of success. With the beginning of penetrating diathermy, success rises sharply for both phakics and aphakics. It will be noted that while unmodified Lacarrere diathermy punctures yielded poor results in 19 cases, a combination of Walker pins and Lacarrere diathermy punctures showed up well, particularly on aphakic eyes.

Five straight thermophore operations showed 60-percent success after first operation and one case was successful after second operation, raising the percentage of success to 80.0. Two cases of Lacarrere-Thermophore combined showed 50.0-percent successful reattachment. This number of cases affords too small a basis for reliable comment.

TABLE 17

COMPARISON OF RESULTS OBTAINED BY OPERATIONS FOR RETINAL DETACHMENT IN VARIOUS YEARS (PHAKICS ONLY)

Year of Treatment	Number of Cases	Successful Reattachment (Percentage)
1927–1929	6	16.7
1930–1933	25	36.0
1934–1936	42	50.0
1937–1944	173	53.8

3. Subretinal Fluid. The amount of subretinal fluid obtained at operation has little effect on the final reattachment (table 19).

4. Use of Perforating Diathermy Before or After Escape of Subretinal Fluid. When diathermy punctures were made both before and after escape of subretinal fluid, the effect was about the same as when the punctures were performed only before the escape (table 20).

5. Area Coagulated (table 21). In detachments of comparable size, equally successful results were obtained when extensive areas

TABLE 18

COMPARISONS OF RESULTS OBTAINED BY VARIOUS TECHNIQUES FOR RETINAL DETACHMENT

Technique	Phakics		Aphakics	
	Number of Cases	Successful Reattachment (Percentage)	Number of Cases	Successful Reattachment (Percentage)
Gonin	15	33.3	0	0
Gonin—Other	2	0	0	0
Various older procedures	8	0	2	0
Total of early procedures	25	20.0	2	0
Safar	17	54.0	3	0
Walker	124	51.6	39	35.8
Walker-Lacarrere	45	64.4	9	55.6
Lacarrere	19	27.8	3	0
Lacarrere—Other	10	50.0	0	0
Total of penetrating diathermy	215	52.2	54	35.0
Thermophore	5	80.0	0	0
Lacarrere—Thermophore*	2	50.0	1	0
Total Thermophore	7	71.4	1	0

* Also included above under Lacarrere—Other.

were coagulated and when coagulation was limited to the area around the hole or one quadrant. When three quadrants were detached the best mechanical results were obtained when the area of coagulation was relatively limited. Extensive barrage of all three quadrants was less successful in 13 cases.

reattachment was strikingly reduced. In 166 phakic cases in which the retina was found flat or only slightly elevated at the end of operation, in 60.8-percent successful reattachment occurred. However, in 72 cases where the retina remained greatly elevated at the end of operation, only 29.2 percent were eventually successful. In 37 cases of aphakia where the retina was flat or only slightly elevated at the end of operation, 43.2 percent were successful, whereas in 16 aphakics with greatly elevated retina at end of operation, there was only 6.3-percent success.

TABLE 19

RELATION OF AMOUNT OF SUBRETINAL FLUID OBTAINED AT OPERATION TO FINAL REATTACHMENT

Amount of Subretinal Fluid Obtained	Phakics		Aphakics	
	Number of Cases	Successful Reattachment (Percentage)	Number of Cases	Successful Reattachment (Percentage)
None	5	40.0	0	0
Moderate	188	51.1	39	33.3
Large	53	49.1	18	43.7

TABLE 20

COMPARISON OF RESULTS WHEN PERFORATING DIATHERMY IS USED BEFORE OR AFTER ESCAPE OF SUBRETINAL FLUID

Time of Perforating Diathermy	Phakics		Aphakics	
	Number of Cases	Successful Reattachment (Percentage)	Number of Cases	Successful Reattachment (Percentage)
Only before escape of subretinal fluid	137	52.6	38	31.6
Before and after escape of subretinal fluid	102	51.0	19	42.1

TABLE 21

RELATION OF AREA OF COAGULATION AND SIZE OF DETACHMENT TO POSTOPERATIVE RESULTS

Area Coagulated	Size of Detachment							
	1 Quadrant		2 Quadrants		3 Quadrants		4 Quadrants	
	Number of Cases	Percent Reattached	Number of Cases	Percent Reattached	Number of Cases	Percent Reattached	Number of Cases	Percent Reattached
Only around hole	7	57.1	12	66.6	3	100.0	5	20.0
1 Quadrant	23	78.2	20	40.0	7	57.1	3	33.3
2 Quadrants			103	50.5	17	47.2	10	30.0
3 Quadrants					13	23.1	3	0

6. Position of Retina at End of Operation. The position of the retina following evacuation of subretinal fluid was found to be of utmost importance in determining final reattachment (table 22). When the retina remained greatly elevated at the end of operation, the likelihood of successful

7. Intraocular Injections. During the past

few years in those cases when at the end of the diathermy operation the retina was still elevated, attempts have been made to restore the retina to proper position at the close of operation by the intraocular injection of either air or saline. The importance of leaving the retina relatively flat at the end of operation has been emphasized above. In many of those cases in which ophthalmoscopic examination revealed marked elevation of the retina persisting after the evacuation of subretinal fluid, saline has been injected into the anterior chamber or vitreous of aphakic eyes. Intravitreous injections are ordinarily made by first incising the sclera with a Ziegler knife or preferably diathermy current to prevent intraocular hemorrhage and aid in sealing off the retinal hole made by the needle. A small gauge hypodermic needle on a 2-cc. syringe is then inserted into the vitreous under direct observation through a dilated pupil or with an ophthalmoscope. Sufficient saline is injected to make the globe firm or to restore the retina to its proper position. Anterior-chamber injections with a hypodermic needle are facilitated by first making a slanting Ziegler incision in the peripheral cornea.

The results of these intraocular injections are given in Table 23. Of 15 phakics in which the retina failed to fall back properly after the withdrawal of subretinal fluid, injection of saline through the attached portion resulted in seven successes (46.7 percent), an improvement but not significant difference from those cases in which the retina was allowed to remain elevated (table 22). Injection of saline through a quadrant in which the retina was detached gave poor results (only one cure in 11 attempts). The intraocular injection of saline by any route in aphakics resulted in significant improvement over those in which the retina remained greatly elevated at the close of operation (table 22). From this table it is evident that in phakic eyes, the injection of

TABLE 22

IMPORTANCE OF POSITION OF RETINA AT END OF OPERATION RELATIVE TO FINAL REATTACHMENT

Position of Retina at End of Operation	Phakics		Aphakics	
	Number of Cases	Successful Reattachment (Percentage)	Number of Cases	Successful Reattachment (Percentage)
Flat	85	65.9	21	42.9
Slightly elevated	81	55.6	16	43.8
Greatly elevated	72	29.2	16	6.3

TABLE 23

EFFECT OF INTRAOCULAR INJECTIONS IN OPERATION FOR RETINAL DETACHMENT

Injection	Phakics		Aphakics	
	Number of Cases	Successful Reattachment (Percentage)	Number of Cases	Successful Reattachment (Percentage)
None	218	52.8	25	44.0
Saline through detached retina	11	9.1	6	33.3
Saline through attached retina	15	46.7	3	33.3
Saline in anterior chamber	0	0	14	35.7
Total number saline injections	26	30.6	23	34.5
Air injections	0	0	9	11.1

TABLE 24

INCIDENCE OF SUCCESSFUL DETACHMENT OPERATIONS AFTER PREVIOUS FAILURES

Operation	Phakics		Aphakics	
	Number of Cases	Successful Reattachment (Percentage)	Number of Cases	Successful Reattachment (Percentage)
After first	246	40.6	58	25.9
After second	72	26.4	22	18.2
After third	18	33.3	15	0
After fourth	5	20.0	3	0
After fifth	1	100.0	0	0
Total cases, one or more operations	246	50.3	58	32.8

saline was apparently of no value, the incidence of mechanically successful reattachments following this procedure being 30.6 percent, against a 29.2-percent success in those cases when the retina was elevated at the end of operation, and no saline injection was made. In aphakic eyes, however, the procedure appeared of definite value, the incidence of mechanically successful reattachments following such injections being 34.5 percent, while in those aphakic eyes when the retina was still elevated at the end of operation, and no saline injections were made, the incidence of mechanically successful reattachments was only 6.3 percent (table 22).

Injection of air in aphakics proved unsatisfactory, only one success being obtained in nine cases.

No serious complications followed the intraocular injections; for example, infection, cataract, hemorrhage, or persistent vitreous opacities. However, attempts to introduce the needle through the detached portion of the retina tended to push off the retina further, and to produce a larger tear through which the saline could escape. Large tears would frequently permit the saline to escape without pushing back the retina.

8. Subsequent Operations. The literature is scanty on the subject of reattachmentment after two or more operations, and it is therefore of interest to analyze cases in this series to this end (table 24). The retinas of about 41 percent of phakic detachments were successfully reattached on the first attempt. Of the 145 cases which failed less than half had second operations, with 26.4-percent resulting success. Although the ratio is smaller than that achieved in the first attempt, it shows that one failure is by no means final, and offers strong incentive to reoperate. For phakics, the incentive exists for even as many as five operations. Reoperations have raised the final percentage of success to 50.3 percent, notably higher than the 40.6 percent at which it would have remained had not the undiscouraged surgeons, with

TABLE 25

FINAL VISUAL RESULTS IN MECHANICALLY SUCCESSFUL REATTACHMENTS

Final Corrected Vision	Phakic		Aphakic	
	Number	Percentage	Number	Percentage
20/20 and better	22	18.0	1	51.0
20/30 to 20/40	36	29.5	6	30.0
20/50 to 20/100	38	31.2	7	35.0
20/200 to 20/400	25	20.5	6	30.0
Less than 20/400	1		0	0
Unknown vision	2			

the permission of undiscouraged patients, "tried again." Of the 43 aphakics whose retinas failed to reattach on the first try, 22 resubmitted to operations and four were rewarded by recoveries on the second attempt. No successes were noted beyond the second operation in 18 third and fourth attempts. Only one operation after failure is therefore advised.

Final visual results

The final visual results in 122 phakic eyes and 20 aphakic eyes in which a mechanically successful reattachment of the retina was obtained are given in Table 25.

The causes for the poor visual results; that is, below 20/40, are shown in Table 26. The predominating causes were macular degeneration and vitreous opacities, conditions which are probably the concomitants of long standing detachments.

TABLE 26

Causes of poor final vision in mechanically successful reattachments

Cause	Phakic		Aphakic	
	Number	Percentage	Number	Percentage
Macular degeneration	28	43.8	5	41.7
Vitreous opacities	20	31.2	7	58.3
Secondary cataracts	5	7.8	0	0
Phthisis bulbi	0	0	0	0
None of the above causes	1	15.6	0	0
Total	64		12	

Summary

A survey of 246 cases of retinal detachment in phakic eyes and 58 cases of detachment in aphakic eyes reveals the following findings:

A. Etiologic factors

1. Forty percent of the detachments occurred in phakic eyes with myopia, but myopia was relatively uncommon in aphakia.

2. Evidence of vitreous disturbances was present in many of the cases in this series. Floating vitreous opacities were present in 46 percent of the phakic eyes and 10 percent of the aphakic eyes. In aphakia it has been shown elsewhere[7] that the loss of vitreous is associated with high incidence of later detachments of the retina. Such detachments occur relatively late after the cataract extraction, suggesting that degenerative changes in the vitreous have probably been taking place in the intervening period.

3. Myopic and cystic degeneration of the retina were found in 18 percent of the phakic eyes, a likely forerunner of retinal perforations. It is not clear whether 5 percent of the phakic and 10 percent of the aphakic eyes which had a positive aqueous ray at the time of operation represent a low-grade uveitis or possibly are secondary to degenerative changes.

B. Preoperative clinical findings determining favorable and unfavorable prognosis

1. Phakic eyes. The following clinical features if present indicate a poor prognosis: Total detachment of the retina; a positive aqueous ray: myopia over 10 diopters; and an age over 70 years. Less significant factors include the inability to find a hole in the retina, and an age level over 60 years.

2. Aphakic eyes. Those paitents in which the detachment had been present over two months obtained poor operative results, only one successful reattachment being obtained out of 11 cases. Other suggestive detrimental factors include the loss of vitreous at time of

cataract extraction, and the inability to detect a retinal tear.

C. Comparison and evaluation of the results of various operative techniques

1. A notable improvement in final results has followed the institution of various techniques using penetrating diathermy in spite of the fact that more unfavorable cases have been operated upon. Although the number of cases in each group is too small to permit any definite conclusions as to the best operative technique, the use of Walker pins often accompanied by multiple Lacarrere punctures appears to be the most successful.

2. The amount of subretinal fluid evacuated at operation and the escape of subretinal fluid before the diathermy have no appreciable influence on the operative prognosis.

3. For large detachments involving three quadrants, the best results were obtained when the area surrounding a demonstrated retinal perforation and not more than two quadrants were included in the coagulation.

4. The position at the end of operation is of great importance in the determination of final result. This is especially true in aphakic eyes. In aphakic eyes the injection of saline through the pupil into the vitreous chamber was of significant aid in restoring the retina to its proper position and increasing the incidence of mechanically successful reattachments.

5. In aphakic eyes in which the first operation was unsuccessful, a second operation succeeded in 18 percent of the cases. No successes were obtained after two operations in aphakic eyes, while in phakic eyes one success was obtained even after the fifth operation.

Johns Hopkins Hospital (5).

References

1. Phelps, Seymour: Prognosis in detachment of the retina. Practitioner, **143**:637-742 (Dec.) 1939.
2. Borley, W. E.: Shortening of the eyeball for retinal detachment. Arch. Ophth., **23**:1181-1187 (June) 1940.
3. McKeown, H. S.: End results of electro-surgical treatment. Arch. Phys. Therapy, **21**:489-493 (Aug.) 1940.
4. Holst, J. C.: Ueber Traumatische Netzhautlösungen. Acta Ophth., **18**:190-203, 1940.
5. Johnson, George L.: Vitreous, zonule and ciliary processes from a surgical point of view. Arch. Ophth., **25**:25-31 (Jan.) 1941.
6. Shapland, C. D.: Retinal detachment in aphakia. Tr. Ophth. Soc. U. Kingdom, **54**:176-196, 1935.
7. Hughes, W. F., Jr., and Owens, W. C.: Extraction of senile cataract. Am. J. Ophth., **28**:40-49 (Jan.) 1945.
8. Jeandelize, Bandot, and Gault: Aphake Operatoire et Decollement Retinien. Bull. et mém. Soc. France d'Ophth., **48**:305-316, 1935.
9. Samuels, B.: Pathologic picture of retinal detachment: A survey. Arch. Ophth., **21**:273-314 (Feb.) 1939.
10. Gradle and Meyer: Surgery of retinal detachment: End results of various methods. Am. J. Ophth., **19**:873-881 (Oct.) 1936.
11. Arrizonis, P.: Prognose der Netzhautablösung ohne Riss. Schweiz. med. Wchnschr., **69**:1140 (Nov.) 1939.
12. Weve, H.: Diathermic treatment of giant holes in the retina. Arch. Ophth., **16**:173-187 (Aug.) 1936.
13. Schauren, Josef: Netzhautablösung u. Indirekter Trauma. Arch. f. Ophth., **14**:72-98, 1939.
14. Zorab, E. C.: Surgical cure of an unusual detachment of the retina. Brit. J. Ophth., **25**:229-231 (May) 1941.

THE VALUE OF INJECTING SALINE INTO THE VITREOUS AS AN ADJUNCT TO DIATHERMY OPERATIONS FOR RETINAL DETACHMENT*

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In the treatment of retinal detachments, injections into the vitreous cavity were tried long before Gonin pointed out the necessity of closing retinal holes to obtain reattachment. Thus Deutschmann[1] (1895) tried injecting rabbits' vitreous, Rohmer[2] (1912) injected air, and Wood[3] (1920) injected a mixture of saline and subretinal fluid. These early injections, given with the idea of forcing the retina back against the choroid, were usually doomed to failure because the retinal holes were not closed. As early as 1902 Galezowski[4] aspirated subretinal fluid and also cauterized the sclera over retinal tears, but his work unfortunately did not gain acceptance and was overlooked for many years.

In the modern surgical treatment of retinal detachments, it is well recognized that not only must an artificial choroiditis be created at such sites as to close the retinal holes, but that subretinal fluid must be drained through openings in the sclera if a high percentage of reattachments is to be attained. The openings through the sclera are most frequently made by means of diathermy puncture or trephine, and should remain patent a number of days. The physiologic formation of aqueous postoperatively is usually counted upon to fill the vitreous cavity, displacing the subretinal fluid and forcing the retina back in contact with the choroid. However, in eyes with very marked elevation of the retina and slow formation of aqueous, the scleral openings may close before this desired result is obtained or else the areas of artificial choroiditis are no longer active enough to close the retinal holes by the time the retina arrives in contact with the choroid. In such cases it is now common practice with many ocular surgeons either to remove subretinal fluid at the time of operation by means of suction applied through the scleral openings or to inject air into the vitreous cavity in order to force the retina back into place at the time of operation.

During the past seven years patients with retinal detachment operated on by members of the full-time staff or the house staff of the Wilmer Institute frequently had saline injected into the vitreous at the close of the diathermy operation in order to force subretinal fluid out of the eye and if possible reposit the retina against the choroid. These saline injections were usually performed only if the retina was still markedly elevated after diathermy application and the establishment of pathways through the sclera for drainage of subretinal fluid. Conversely, in most (but not all) instances where the retina remained elevated at that stage of operation, saline was injected. The present study represents an evaluation of the possible beneficial effects of these saline injections.

MATERIAL

During the period from February, 1939, through June, 1946, a total of 305 patients had diathermy operations for detached retina in the Wilmer Ophthalmological Institute of the Johns Hopkins Hospital. An analysis of the case histories of these patients revealed that 155 cases of retinal detachment not secondary to uveitis or perforating injury had diathermy operations performed by members of the full-time staff or the house staff, and had final ophthalmoscopic descriptions recorded by a member of the full-time staff or by the resident ophthalmologist. In six of these cases, detachment operations

* From the Wilmer Ophthalmological Institute of the Johns Hopkins Hospital and University.

were performed on both eyes. The results of operations on these 161 eyes form the basis for this study.

Results

The criterion for successful reattachment of the retina was taken to be a completely flat retina at the time of the last recorded ophthalmoscopic examination. If there was any retinal separation, even apparently localized and nonprogressive, the operation was classified as a failure from the standpoint of reattachment.

In the cases of 159 eyes, the first operation for retinal detachment was performed in the Wilmer Institute. The results of the first detachment operation, classified as to whether the eye was phakic or aphakic and whether or not saline was injected into the vitreous, are shown in Table 1. The results of the second detachment operation, performed on eyes in which the first operation was a failure, are shown in Table 2.

A casual glance at the results pictured in Tables 1 and 2 shows that the percentages of reattachments were not significantly different in those eyes receiving saline injections and in those eyes not receiving saline injections. The natural conclusion to be drawn from a first glance at these statistics is that saline injection into the vitreous does not enhance the probability of reattachment of the retina. However, these figures can be quite misleading. If those eyes receiving saline injections were those with much the poorer prognosis for reattachment, the finding of equal percentages of reattachment in the groups with and without saline injections

TABLE 1

RESULTS OF FIRST DIATHERMY OPERATION FOR RETINAL DETACHMENT IN PHAKIC AND IN APHAKIC EYES WITH AND WITHOUT INJECTION OF SALINE INTO THE VITREOUS

		No. Cases	No. Reattachments	% Reattachments
Phakic eyes	No saline	93	53	57%
	Saline injected	30	17	57%
	Total	123	70	57%
Aphakic eyes	No saline	13	4	31%
	Saline injected	23	6	26%
	Total	36	10	27.8%
Total		159	80	50.3%

TABLE 2

RESULTS OF SECOND DIATHERMY OPERATION FOR RETINAL DETACHMENT IN PHAKIC AND IN APHAKIC EYES WITH AND WITHOUT INJECTION OF SALINE INTO THE VITREOUS

		No. Cases	No. Reattachments	% Reattachments
Phakic eyes	No saline	14	5	36%
	Saline injected	15	5	33%
	Total	29	10	34%
Aphakic eyes	No saline	4	0	0%
	Saline injected	7	3	43%
	Total	11	3	27%
Total		40	13	33%

would indicate that the injections were of real value. In general, saline injections into the vitreous were performed only in those eyes where the retina was still markedly elevated after diathermy had been applied and adequate openings made (either by diathermy puncture, trephine, or knife) between the subretinal space and the outside of the sclera.

It has long been our clinical impression that an eye in which the retina flattens out at the close of diathermy operation has an excellent chance for reattachment of the retina, and conversely that an eye in which the retina remains markedly elevated at the close of operation has a poor chance for reattachment of the retina, in spite of entirely adequate openings through the sclera for postoperative subretinal drainage. In an attempt to confirm or disprove this clinical impression, we selected for study all those case histories in which a definite statement was contained in the operative note as to whether ophthalmoscopic examination at the close of operation showed the retina to be essentially flat or still definitely elevated. In 49 instances the operative notes contained this information. The final results of these 49 operations, classified as to whether the retinas were flat or still elevated at the close of the operation, are shown in Table 3. The tremendous difference in these results (69-percent reattachments contrasted to 29-percent reattachments) amply confirms our impression that an essentially flat retina at the close of operation carries with it a good prognosis, and vice versa.

Inasmuch as saline injections into the vitreous were used as a means of flattening those retinas which did not largely flatten after establishment of subretinal drainage alone—that is, were used in those cases with the poorer prognosis for reattachment—we are justified in concluding that the saline injections were of value. The percentage of reattachments, in those cases where saline was injected, should have been much lower if saline had not been injected or unless the retina was flattened at the close of the operation by some other means such as injection of air into the vitreous or drainage of subretinal fluid by suction.

Technique of Saline Injection

Injection of saline into an aphakic eye is performed by making a tiny slanting opening through the cornea at the limbus with a Ziegler knife, introducing a 27-gauge hypodermic needle with an attached syringe filled with normal saline through the tract made by the knife, and injecting saline into the anterior chamber. The saline goes back through the pupil into the vitreous cavity.

TABLE 3

RESULTS OF DIATHERMY OPERATIONS FOR RETINAL DETACHMENT CLASSIFIED ACCORDING TO POSITION OF RETINA AT CLOSE OF OPERATION

	No. Cases	% Reattachments
Retina flat at close of operation	26	69%
Retina still elevated at close of operation	23	26%

For injection into phakic eyes, a 27-gauge needle with attached syringe filled with saline is inserted through conjunctiva, sclera, and pars plana of the ciliary body in whichever quadrant the retina is least elevated. As the needle is inserted, diathermy current is passed through it. The needle is inserted in such a direction that the point slants backward from the lens, thus avoiding the danger of injuring the lens. Saline is then injected directly into the vitreous cavity.

In either phakic or aphakic eyes the injection is performed only if the retina remains appreciably elevated after the diathermy operation, including establishment of adequate scleral openings for subretinal drainage, is completed. The saline is injected before the conjunctiva is closed. It is injected slowly, forcing subretinal fluid out of the scleral punctures and forcing the retina back into

contact with the choroid. A sufficient amount is injected to flatten the retina as completely as possible. If there is not too large a retinal tear, the retina can usually be flattened completely or almost so; the globe will become quite firm when all the subretinal fluid has been displaced, and the reposition of the retina and the firmness of the globe will persist after the needle is withdrawn. However, if there is an extremely large tear or disinsertion, the saline will often pass through the tear and out the scleral punctures without flattening the retina. If such is the case, the globe will not become firm and any amount of saline (10 cc. or more) can be injected without producing the desired flattening of the retina.

In three phakic eyes an attempt was made to introduce saline into the vitreous by way of the anterior chamber, as is done in aphakic eyes. In one case the saline did pass between the iris and lens and filled the vitreous chamber but in the other two the lens-iris diaphragm was merely displaced backward.

Comment

Saline injected into the vitreous does not produce any inflammation. Injection of anything directly into the vitreous cavity will cause some disruption of the vitreous with minor vitreous opacities if the vitreous is "formed." However, all eyes with marked separation of the retina already have considerable disorganization of the vitreous, and inasmuch as saline injections are reserved for such eyes, the injection is in itself a benign procedure. The use of "vitreous" from another eye for such injections must rest on a misconception of the structure of the vitreous. Once vitreous passes through a needle its structure collapses, so that it becomes merely slightly viscous aqueous containing strands of protein molecules which can only serve as vitreous opacities.[5] Actually, saline is not only as good but is better than "vitreous" for injection into the vitreous cavity, because the injection of saline will not introduce undesirable opacities.

We have preferred injecting saline into the vitreous rather than air because saline does not hinder ophthalmoscopic examination. It is theoretically possible that air would flatten a retina which saline would not, since saline may pass through a retinal tear more easily than air. However, in three cases in this series in which injection of saline failed to flatten the retina, injection of air also failed to flatten the retina. These three cases represent the only instances in which air was tried after saline failed. Also, it is possible for air to enter the subretinal space and increase the detachment. It seems probable that if saline injection does not flatten the retina, it is better to try evacuating the subretinal fluid by suction.

Summary

Reattachment of the retina was obtained in 69 percent of eyes in which the retina looked flat at the close of operation. In contrast, reattachment was obtained in only 26 percent of eyes in which the retina was very appreciably elevated at the close of operation.

Injection of saline into the vitreous at the close of a retinal detachment operation will very often flatten the retina in those cases where the retinal elevation does not largely disappear after merely establishing adequate drainage of the subretinal fluid. In a series of diathermy operations for retinal detachment, including 159 first operations and 40 second operations, saline was injected into the vitreous in most instances where the retina remained quite elevated at the conclusion of diathermy application and scleral punctures. The percentage of reattachment in these eyes was as high as the percentage of reattachment in those eyes where saline injections were not necessary to cause flattening of the retina. We believe saline (or air) should be injected unless the retina flattens almost completely without the necessity of such a procedure.

Johns Hopkins Hospital (5).

References

1. Deutschmann, R.: Ueber ein neues Heilverfahren bei Netzhautablösung. Beitr. z. Augenh. 20:1-80, 1895.
2. Rohmer: Effets des injections d'air sterilese dans le vitre contre le decollement de la retine. Arch. d'Opht. 32:257-274, 1912.
3. Wood, P. J.: Detached retina. Brit. J. Ophth., 4:413-415, 1920.
4. Galezowski, X.: Nouveau procede operatorie dans le decollement de la retine. XV Congres de Chirurgie. Paris, 1902, p. 417-420.
5. Friedenwald, J. S., and Steihler, R. D.: Structure of the vitreous. Arch. Ophth., 14:789-808 (Nov.) 1935.

INTEGRATED IMPLANTS AND ARTIFICIAL EYES FOR USE AFTER ENUCLEATION AND EVISCERATION*

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Seven years ago necrosis of the cornea occurred in a case of gold-sphere implantation into the sclera by the method of Burch at the time of an evisceration, leaving an eye with what appeared to be a gold cornea.† The motility of the implant was perfect, exactly like the other eye, since the muscle acted normally on the intact sclera. This case stimulated the thought that, if an artificial eye could be attached to the implant by some means, it would improve the eye since there would be little or no lost motion between the stump and the artificial eye as is present in the conventional artificial eye.

In this case, the gold ball was removed six weeks later because it was felt that, if an ordinary artificial eye were fitted, it would come directly in contact with the gold sphere and that scratches on the eye and implant would result in tissue irritation. The probability of an ascending infection was borne in mind.

Ruedemann's[1] epoch-making work, demonstrating that an eye can be sewed in place and that sufficient sealing off will take place around the implanted eye to prevent an ascending infection, stimulated more intensive development of permanently retained, partially exposed implants and integrated detachable artificial eyes which could be replaced or adjusted for position when desired. This paper is a preliminary report of the results to date.

Search for materials

Search for a proper substance from which to make the implants was begun. The most likely materials seemed to be the various plastics, tantalum, gold, and Vitallium.

Plastics were rejected because it was felt that (1) the design contemplated for the implant would not be sufficiently strong if made in one piece; (2) there might be some wear and scratching over a period of time; (3) occasional allergy to plastics might cause tissue reaction in some cases; (4) aging of the plastics might cause cracks to develop; (5) if metal parts were combined with plastic, there would be cracks and crevices for stagnant secretions to collect and infections would be difficult to eliminate.

Gold was rejected because of its prohibitive price. The cost of the raw metal that would be needed to make only one enucleation implant would be about $65.

Tantalum was rejected because of the re-

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* Read at the meeting of the Section of Ophthalmology, New York Academy of Medicine, April 21, 1947.

† Movies were taken of this operation and the case was reported at a meeting of the New York Ophthalmological Society in 1941.

action it produces in tissues adjacent to the metal. While this might be desirable in certain locations such as in skull plates, it could lead to limitation of motility if the delicate fascias and muscles controlling movement of the implants were involved. Tantalum is also difficult to fabricate.

Vitallium* was finally selected because of its moderate cost, its strength, its adaptability to casting in any shape, and its prolonged use in orthopedic surgery and dentistry with minimal tissue reaction.[2] This material, an alloy composed of molybdenum, cobalt, and chromium, has practically no electric potential and, therefore, very little tissue reaction in the body.[2] It has been used for buried eye implants,[3] dental plates, colostomy plugs, bile-duct repairs, bone screws and plates, and replacement of portions of bones, such as the jaw, femur, skull, and so forth.

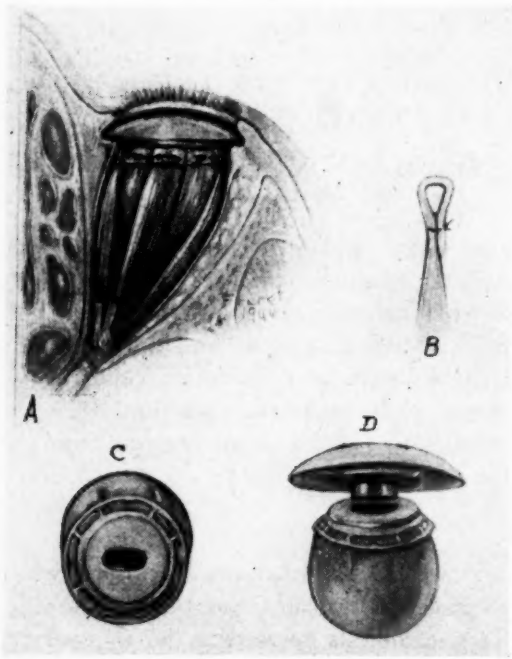

Fig. 1 (Hughes). Original model Vitallium enucleation implant. (A) Method of suturing muscles and fascia to the attachment bar of the enucleation implant. (B) Method of suturing tendon strip around the bar. (C) Front view. (D) Surgical form with peg fitting into depression on front of implant.

* Made by Austenal Laboratories, 224 East 39th Street, New York, New York.

Description of implants

Preliminary models for the implants were made up in brass and discarded until the present designs were decided upon. Two types were made first—one for enucleation (fig. 1) and one for evisceration (fig. 2). Each type had the same standard anterior surface with an oval depression for the reception of a peg on the back of an artificial eye to integrate the movement of the eye with the implant and to help support the eye.

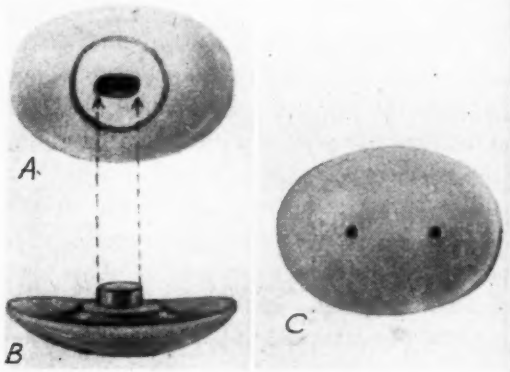

Fig. 2 (Hughes). Original model Vitallium evisceration implant. (A) Front view. (B) Surgical form. (C) Surgical form, front view.

The third type is now ready for use in replacing certain buried implants after enucleation and evisceration.

Enucleation implants

An integrated enucleation implant for immediate use at the time of enucleation is illustrated in Figure 1C. The posterior three fifths of the implant is spherical, approximately 18 mm. in diameter with a highly polished, smooth surface. The anterior portion of the body of the implant is extended to form approximately a truncated cone ending in a flat face, 10 mm. in diameter. On the anterior surface of this flattened portion is a roughly rectangular depression, with all its

angles and corners rounded extending backward. Its sides slope very slightly for the reception of a slightly tapered peg with similarly rounded corners extending from the rear surface of the artificial eye.

Surrounding this neck is a ring attached to it by eight small attachment bars providing spaces for the ocular muscle tendons in the horizontal and vertical locations and for the reception of the fascia bulbi (Tenon's capsule) in the four diagonal positions. There is sufficient clearance between the bar and the implant to allow for the passage of the tendons of the muscles and the fascia bulbi.

Operative technique. Enucleation. The conjunctiva is ballooned up slightly over the sclera. It is incised around the cornea and dissected back beyond the recti muscle insertions. Parallel incisions are made 4 to 5 mm. apart through the outer two thirds of the sclera toward the limbus parallel to the margins of the tendons for a distance of 3 to 4 mm. in front of the muscle insertions. These strips of sclera in front of the insertion of each rectus tendon are shaved off to the depth of two thirds of its thickness and remain attached to the tendons. These are for the purpose of extending the length of the tendons so that they will be sufficiently long to pass around the attachment bar without tension. One end of a double-armed, 4-0 white-silk (cotton or linen seems to do equally well) suture is passed through one side of each scleral strip and laid aside; 3-0 plain gut sutures may be used equally well.

The enucleation then proceeds in the usual manner. The oblique muscle insertions and posterior small nerves, arteries, and optic nerve are severed. After the oblique muscle tendons are severed, a tonsil snare can be passed over the eye and the structures, posteriorly, including the optic nerve and ophthalmic artery and vein, can be severed. There is less bleeding by this method but it is difficult to get a long section of the nerve if desired. If an intraocular tumor is suspected, the enucleation scissors are used to section the nerve farther back.

When the enucleation is completed, the implant is placed into Tenon's capsule with the long axis of the depression on its front surface placed horizontally. The double-armed white sutures, previously placed in the tendon strips, are threaded through the four horizontal and vertical spaces provided. The muscle tendons with the scleral strips attached are pulled forward and under the bar and sewed back to the muscle itself, forming a complete loop around the bar. An additional suture is placed on the other side of the tendon to spread out its attachment as much as possible (fig. 5). Two sutures are used to attach each of the four strips of fascia bulbi between the muscles (Tenon's capsule) around the bar in a manner similar to the muscle attachments. The fascia is pulled forward between the ring and the body of the implant and is sewed back to itself with two sutures spreading it out as widely as possible. In all, 16 sutures are used, two for each muscle and two for each fascial strip. The conjunctiva is then sewed down around the flat anterior face, anchoring it to the tissues passing over the ring, to assure its healing in the proper position, leaving the face exposed but covering all underlying tissues. A form (fig. 1D) is then placed in the conjunctival sac to retain the fornices, and a moderate pressure dressing is applied. The dressing is changed in 5 to 7 days and, thereafter, every 3 to 5 days for a period of three weeks. For the first two weeks a peep hole of not more than 1.5 cm. is used over the good eye. Hot compresses and mild cleansing drops and ointment are used after the dressing is removed in three weeks.

Integrated implant for replacing buried implants

In cases in which an implant has been buried previously at the time of an enucleation, the implant can be removed and a somewhat similar type with a smaller body (12

mm. diameter) can be implanted in its place. This is feasible if there is good motility of the buried implant and if there is sufficient tissue to form connective-tissue strips attached to the recti. The original implant should also be in approximately normal location and the fornices of normal depth.

Operative technique proposed. The operation of replacing the buried type of implant with the integrated implant can be done either under local or general anesthetic. The conjunctiva is ballooned up so that the fascia in front of the old implant can be separated and dissected into strips, 3-mm. wide, attached to each of the tendons of the recti muscles. These strips are then passed around the attachment bar of the implant and sewed back to themselves in a manner similar to that described in the enucleation implant operation. In the diagonal positions, a sheet of fascia bulbi is dissected and passed forward around the bar in its diagonal positions in a like manner. The conjunctiva is also closed in a similar manner.

In some cases, sufficient tissue may be present on the anterior surface of a large buried implant to permit the use of the larger regular enucleation implant. The strips that pass around the ring to retain the implant should do so without tension. If the larger implant fits easily, it should be used. Procedures for the completion of the operation are similar to those previously described.

Integrated implant for use in evisceration

The original design for this implant was irregularly oval, extending anteriorly to a flat face with an oval indentation similar to the two implants already described. Of the four of these implants used, one was extruded at the end of six months. Two bars were then added,* one above and one below, through which a tongue of sclera could be passed in order to anchor the implant from behind.

Operative technique. The eye is held down by a retention suture at the upper limbus. A transverse conjunctival incision is made over the superior rectus insertion. A suture (double-armed, 3-0 plain catgut) is tied into the muscle tendon which is then detached. An arcuate scleral incision is made. This is a concave posteriorly or V-shaped incision with its apex forward directly behind the insertion of the lateral rectus, and with its use there should be less likelihood of neurotrophic atrophy of the sclera anterior to the incision because there is less severing of blood vessels and nerves than with the straight horizontal incision.

The evisceration is done through the scleral incision, using an iris repositor to detach the root of the iris from the scleral spur and the retina and choroid around the optic nerve. With a large mastoid curette the contents of the eye can usually be removed en masse and, very frequently, the normal anatomic relationships of the iris, lens, ciliary body, choroid, and much of the vitreous body can be preserved for specimen examination, if desired. The interior of the sclera is inspected to see that the scleral cavity is clean. The implant is then placed into the scleral cavity through the upper incision and the cornea is then removed at the limbus. The implant is adjusted to proper position so that the flat surface protrudes through the corneal opening with the long axis of the depression horizontal. The upper scleral incision is sewed up, the scleral edges overlapping, and the superior rectus is replaced. The conjunctiva is sewed up with a continuous mattress suture of 5-0 catgut.

Final step in each of the above procedures. A transparent, concave-convex form is placed over the implant and into the conjunctival fornices to retain them in proper position. In an emergency, if the regular

* One more was extruded after 4½ months necessitating a change in design.

transparent ones are not available, a form can be fashioned for this purpose out of dental wax. A fine dusting of sulfadiazine or tantalum oxide and a moderate pressure dressing are applied. The dressing is changed at intervals of 4 or 5 days for a period of 2½ to 3 weeks. After this, hot applications and mild cleansing drops with some sulfathiazole ointment are used three times daily.

The evisceration cases are usually ready for artificial-eye fittings at the end of 4 weeks, and the enucleation cases at the end of 4 to 6 weeks. As soon as the reaction has subsided, a fitting form is inserted for the purpose of locating the pupillary position so it will match the other eye. The color of the iris is matched in daylight with the iris of the normal eye, the average size of the

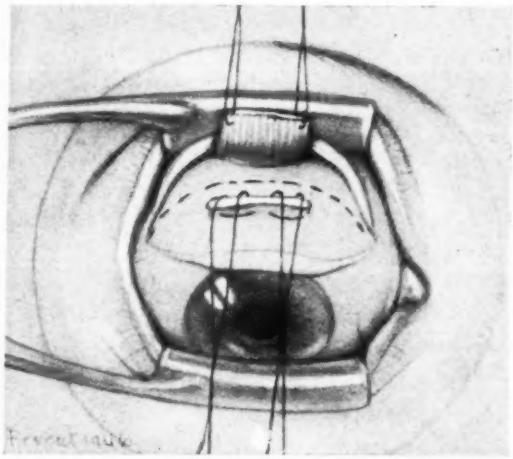

Fig. 3 (Hughes). Evisceration implant operation. Superior rectus detached and incision in sclera planned.

pupil is noted, any enophthalmos or exophthalmos is measured, and the data are sent to the artificial eye maker.* The finished eye is then returned with the iris properly located so it will match the other eye. Any final shaping of the margins can easily be done by a technician skilled in artificial-eye making.

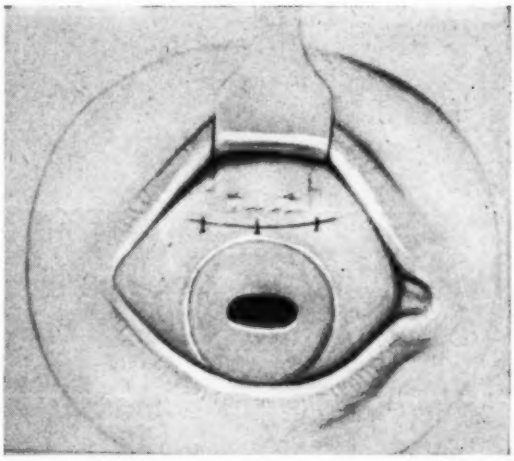

Fig. 4 (Hughes). Implant in place in sclera and incision closed. Superior rectus reattached over the scleral wound.

Case reports

Three cases of evisceration and five of enucleation were the first to be done according to the previously described methods.

Evisceration

Case 1. Mr. W. H., aged 28 years, sustained an injury from an intraocular foreign body which resulted in a chronically irritated eye with phthisis bulbi. An evisceration was decided upon and carried out in the above manner on October 23, 1946. Healing was uneventful. Photographs (fig. 5) show the motility and condition of the lids. The motility was measured on a perimeter and found to be temporally 30 degrees; nasally, 20 degrees; up, 25 degrees; and down, 30 degrees. Although this case had excellent appearance and motility, the implant was extruded after six months.

Case 2. Mrs. C., aged 70 years, had absolute glaucoma with uncontrollable pain. An evisceration was done, as herein described, and the final result is excellent motility and position.

Case 3. Mr. A. E. W., aged 56 years, suf-

* The Monoplex Eye Division of the American Optical Company, Southbridge, Massachusetts, is coöperating in the making of this type of eye.

Fig. 5 (Hughes). A study of Case 1, evisceration with integrated prosthesis. (A) Eyes right; (B) eyes straight; (C) eyes left; (D) eyes up; (E) eyes down.

fered a perforating injury of the right eye in December, 1946. He was admitted to the ward service at the New York Eye and Ear Infirmary, and a conjunctival flap was drawn over the corneal laceration. Severe reaction with intraocular hemorrhage necessitated evisceration three weeks later. The afore-described technique was used. There was considerable edema and encroachment of the conjunctiva of the flap over the flat surface of the implant corresponding to the area of the cornea previously covered. This finally subsided but the upper nasal fornix, where the flap had been previously dissected up, was short. This man was reoperated recently and has been fitted with an artificial eye with excellent movement.

Enucleation

*Case 4.** Mr. A. B. had absolute glaucoma with much irritation and pain of the right

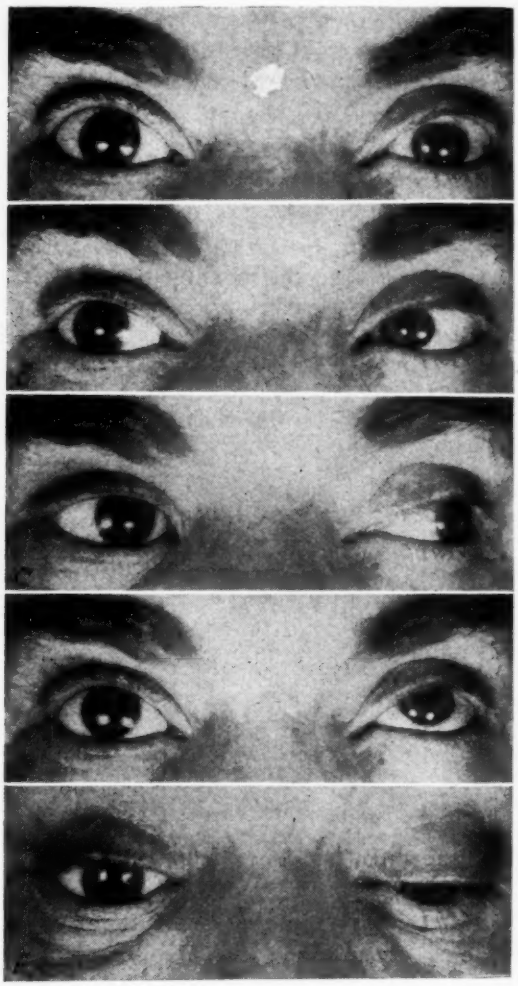

Fig. 6 (Hughes). A study of Case 4, enucleation implant with integrated eye. (A) Eyes straight; (B) eyes right; (C) eyes left; (D) eyes up; (E) eyes down.

* Implant was extruded after 4½ months and was replaced with the more recent replacement type of implant.

eye. Enucleation was done by the technique already described. There was moderate conjunctival edema particularly in the lower fornix for about five weeks after the operation. It was two months before an artificial eye was finally obtained for this patient. A plastic eye with a peg on the back was fitted and the motility (fig. 6) was: nasally, 30 degrees; temporally, 35 degrees; upward rotation, 30 degrees; downward rotation, 30 degrees. The fold in the upper lid and its motility provided an excellent match for the other upper lid (fig. 6).

Case 5. Mrs. O'L. had absolute glaucoma, with tearing and chronic irritation of the right eye. Enucleation was performed, and a vitallium enucleation implant of the above type was inserted. Considerable edema of the conjunctiva, particularly in the lower fornix, persisted for about 7 to 8 weeks. This reaction was attributed, at least partially, to the chronic inflammatory reaction in the eye before enucleation. An artificial eye now gives good movement and holds the upper lid in good position with a normal fold and motility.

Case 6. Mrs. M., a colored woman, aged 56 years, had chronic glaucoma in the right eye and absolute glaucoma in the left eye. An enucleation was done by one of the residents and an integrated vitallium enucleation implant was inserted. There was about 20 degrees of divergence with 15 degrees of hypertropia of the face of the implant. A similar eye was finally fitted six weeks after enucleation with good motility of the prosthesis and normal condition of the upper lid.

Case 7. Mr. A. E.* suffered a laceration of the eye by a piece of wire which was followed by long-continued irritation and edema of the conjunctiva. The surgeon who attended the patient at the time of the original accident said that there was no injury to the ciliary body. There was some shrinking of the cornea and the globe. The regular sized implant was placed in the sclera after evisceration through a >-shaped incision under the lateral rectus, and only after the removal of the corneal portion was it possible to close the scleral incision under considerable tension. Fascia bulbi was drawn over the scleral wound and the lateral rectus reattached. The conjunctiva was closed. Because of difficult closure of the scleral wound, it was felt that the implant would probably be extruded, which event took place 10 days later. The sclera healed into a ball, and motility of the stump was quite good. It is planned to put in the replacement type of implant at a later date.

Case 8. Mrs. B had a melanoma of the ciliary body which was first noticed in the anterior-chamber angle four months after a successful anterior sclerectomy with iris inclusion for congestive glaucoma. The tension had remained normal and the inside of the wound area could be well visualized by gonioscopy. An enucleation implant was inserted, using very short scleral lips at the end of the recti tendons. Five weeks later an integrated eye was fitted. The motility was excellent.

Discussion

This is a preliminary report of the progress in the work on this type of implant to date. The final word will not be written for several years.

Advantages

There are some obvious advantages to this type of implant over the buried type of implant.

1. The motility of the implant is transmitted to the artificial eye because of the integration of the eye with the implant. The slippage between the buried type of implant and the eye is eliminated.

2. The position of the eye may be changed by altering the position of the peg on the back of the eye.

* Case operated on by Dr. Kronenberg.

3. A stock plastic eye can frequently be used by placing a peg on the posterior surface to integrate it with the implant.

4. The motility is excellent in all directions as noted by measurements in several of the cases reported. Convergence was noted on many of the cases.

5. The normal fold of the upper lid is retained and the sinking, so common with ordinary artificial eyes with buried implants, is eliminated. This is due to the eye being supported by the implant through the medium of the peg on the back of the eye integrating it with the implant. The eye is held backward so that the peg is held into the depression on the front of the implant by the normal tonicity and muscles of the lids. The lower lid no longer needs to support the entire weight of the eye plus the pressure exerted by the upper lid.

6. The one-piece metallic, hollow construction of metal, 0.002 inch in thickness, is an advantage over any combination of two substances; for example, the combination of plastic and metal.

Disadvantages

The disadvantages of this type of implant at present apparent are:

1. The mere fact that this is a new procedure and a new type of implant renders the final results uncertain.

2. In order to make this artificial eye the technician needs some special training.

3. The cost of the implant and eye is considerably more than that of the spherical implant and ordinary plastic or glass eye.

4. There is more discharge present with the integrated eye than with the ordinary artificial eye with buried implant. This shows a decrease in the more recent cases and new techniques.

Conclusions

Some progress is being made in the matter of a better type of enucleation and prosthesis than has been thought possible in the past. What the final method of choice will be only further experience with various types of implants and eyes can determine.

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References

1. Ruedemann, A. D.: Tr. Am. Ophth. Soc., **43**:304, 1945.
2. Venable, C. S., and Stuck, W. G.: Internat. Abstr. Surg., Surg., Gynec. & Obst., **76**:297-304, 1943.
3. Doherty, W. B.: Am. J. Ophth. **22**:239, 1939.

OXYCEPHALY WITH OPTIC ATROPHY*

Report on results of the King operation

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Oxycephaly is a congenital abnormality of the bones of the skull in which there is premature synostosis of the cranial sutures. This disorder is followed by extremely serious sequelae and complications, notably marked deformity of the face and head, increase of intracranial pressure, and loss of vision from optic atrophy.

Classification

Faber classifies the common and most important cranial synostosis as falling into three groups.[1] The cases in the first and most common group are due to closure of the sagittal suture with failure of transverse growth of the skull; there is compensatory lengthening of the skull in the anteroposterior dimension, particularly in the occiput, and often elevation of the frontal region (scaphocephaly).

The second group is composed of those cases in which the coronal sutures are involved; here the normal growth in the anteroposterior dimension is inhibited; growth can now occur transversely, producing a short, broad skull often high in the parietal region (brachycephaly).

Comprising the third group are those cases in which the coronal as well as the sagittal sutures are involved; growth is now inhibited in both the anteroposterior and transverse directions and can expand only vertically. With the suture lines closed tightly, only the anterior fontanelle remains open, as the last part of the suture line to close. The brain continues to exert intracranial pressure in all directions. The point of least resistance at the anterior fontanelle slowly gives way; the bony margins are slowly pushed upward until complete ossification occurs. This results in a distorted skull with the bulging portion at the site of the fontanelle. The deformity of the skull, then, is a resultant of two factors: (1) Limitation of expansion in directions perpendicular to the lines of sutural closure, and (2) overgrowth of those areas where suture lines are still open due to growth pressure of the brain.

Signs and Symptoms

The brain itself is not pathologically small, as in microcephaly, and mental retardation is not as prominent a feature. The development of the brain, however, is restrained because of the small intracranial space. The signs and symptoms are those due to chronic increased intracranial pressure; namely, headaches, vomiting, convulsive seizures, and some mental retardation. The intracranial pressure may rise to levels as high as 500 mm. of water. The inner table of the skull becomes thinned and the convolutional atrophy, as seen by Xray, is extreme. The orbital plates are depressed. Friedenwald[2] found that the vertical diameter of the orbit may be decreased by as much as 10 mm. The great wing of the sphenoid may form the posterior instead of the lateral wall of the orbit, which is shortened, deformed, and its axis changed. These factors contribute to the small volume of the orbits in some of these cases, with resultant exophthalmos and possible lagophthalmos and corneal ulceration. Exotropia is frequently seen and probably is related to a distorted orbital axis.

Vision

Fletcher[3] has reviewed the subject carefully and says of the vision in oxycephaly: "This occasionally is unimpaired, but in the majority of cases sight is very defective." Al-

* Presented before the New York Society for Clinical Ophthalmology, February 3, 1947. From the neurologic service of Dr. Nathan Savitsky, Morrisania City Hospital, New York.

gyogyi[4] estimates the incidence of impaired vision at almost one-half the cases of oxycephaly. Of Mehner's 21 cases, 15, or 71 percent, showed it.[5] Loss of vision occurs early. The choice of operative procedure for prevention or palliation depends upon the underlying pathologic conditions.

Unfortunately, confusion has arisen from a long-standing difference of opinion as to whether the optic atrophy is a result of the increased intracranial pressure or of a narrowed optic foramen. The appearance of choked disc has been observed in many cases. Transition from papilledema to secondary optic atrophy has also been seen. Sometimes, one disc is papilledematous and the other atrophic. Although most reviews of the subject speak of secondary optic atrophy, case reports in the same papers describe the typical appearance of primary atrophy. In 91 percent of Gunther's[11] cases, optic atrophy developed.

It is always a great temptation to diagnose secondary atrophy when the intracranial pressure is known to be very high. This was true in the report by Levine[6] of the case operated by Cushing in 1916; secondary optic atrophy was reported many times until 21 years later when examination revealed typical medullated nerve fibers.

In some cases, it may be that deformities of the body or wings of the sphenoid lead to narrowing of the optic foramen. The hypoplasia of the bones at the base of the skull may result in stenosis of the various foramina-transmitting blood vessels and nerves; venous return may be interfered with, and the optic nerves may be dragged down and injured by being forced against the sharp edges of the sulcus chiasmatis; or they may undergo compression because of an abnormality of the internal carotid artery (Behr).

Faber[7] has studied the case reports that form the basis for the contention that a small optic foramen is the cause of optic atrophy; on critical analysis he finds no basis for this theory. Wilson[8] reports that the foramen opticum itself does not appear to be narrowed as some have maintained. Autopsy reports reveal the optic nerves to be stretched and thinned due to great distortion of the normal anatomical arrangements.

Differential diagnosis

The syndrome of oxycephaly develops during the first five years of life, affecting males more frequently than females, and rarely has a hereditary or familial incidence. The cranial deformity is recognizable at or shortly after birth; the syndrome may develop very slowly; characteristic examples are not likely to be confused with other anomalies of development. Resemblance to craniofacial dysostosis is sometimes rather intimate. Differentiation depends on the local character of the deformity in the dysostosis and the diffuse nature in oxycephaly. The hereditary transmission of craniofacial dysostosis is not seen in oxycephaly. The low sella turcica of oxycephaly is not seen in craniofacial dysostosis.

Differentiation from hypertelorism is made by the presence of marked mental and physical retardation, the great breadth between the eyes and the presence of open suture lines.

Report of a case

I. C., a nine-year-old Negro schoolboy, was first observed on the neurologic service of the Morrisania City Hospital on May 9, 1941. The patient himself had no complaints, but the guardian had noticed abnormal posturing of his head on reading; for the preceding year he had developed the habit of turning his head to the right to allow reading matter to be visualized by the left eye. There was an occasional frontal headache. Adequate familial history, as well as details of his birth and postpartum development, were not obtainable. His mother had died five years previously, cause unknown, and he was under the care of a guardian. Two siblings were living and well. Apparently, his development had been normal. School was begun at the age of seven years and there had been adequate progress. There were no per-

sonality difficulties and no history of craniocerebral trauma or convulsions.

Physical examination

Examination revealed a well-developed, adequately nourished, nine-year-old Negro boy with a peculiarly shaped head (figs. 1 and 2). Measurements revealed the cranium to be smaller than normal with elongation in the anteroposterior and narrowing in the transverse diameters. The boy was alert and coöperative, bright and of average intelligence. There were no focal neurologic signs. General physical examination failed to reveal any abnormalities. Blood, urine, and serologic studies were negative.

Ocular examination

There was no exophthalmos. The motility was not impaired and no strabismus was evident. There was moderate insufficiency of convergence.

Right eye. Vision was light perception with poor projection. The pupil was larger than its fellow and reacted sluggishly to light through a small arc. It responded well consensually. Optic atrophy of the primary type was present. A visual field could not be obtained.

Fig. 1. (Lisman). Lateral view of head taken when the patient was nine years of age. The skull is small in the anteroposterior diameter but does not rise to a point at the site of the fontanelle.

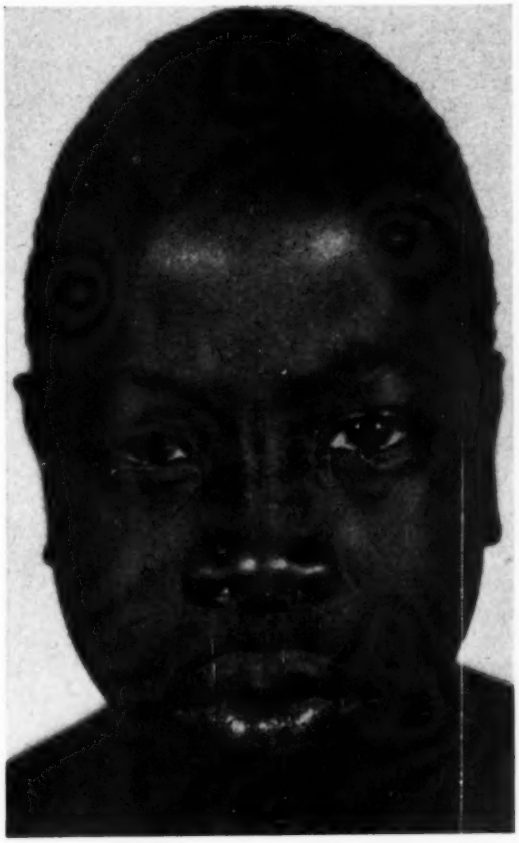

Fig. 2 (Lisman). Frontal view of the head at the age of nine years. The narrowing in the transverse diameter is evident.

Left eye. Vision was 20/20. The pupillary responses were physiologic; the consensual reaction was poor. The nerve head was suspiciously pale in the temporal half only. The visual field was normal in its extent, without contractions or scotomas; the blind spot could not be mapped out.

Laboratory studies

X-ray studies of the skull (figs. 3 and 4) showed an increase in height of the cranium together with a narrowing in its transverse diameter. There was marked convolutional atrophy of the inner table. The sella turcica was normal in position and configuration. The lambdoidal and coronal sutures were

Fig. 3 (Lisman). Lateral X-ray study of the skull showing the convolutional atrophy of the inner table.

open; the optic foramina were of normal size. The sagittal suture was not well visualized.

Spinal tap. Initial pressure was 260 mm. of water. The Ayala index was 4.5. There was no response on pressure over the left jugular but adequate response on the right.

The spinal fluid analysis showed sugar present and no increase in protein or cells.

Diagnosis. A diagnosis of synostosis craniae with optic atrophy was made.

Operation

A King morcellation operation was performed on May 24, 1941, by Dr. Sidney Gross. After reflection of the scalp and periosteum, multiple perforator openings were made on each side of the midline through the bones of the vault down to the dura. These were joined by means of a Gigli saw, leaving only an intact ridge of bone over the longitudinal sinus. As the fragments of bone were cut loose, each became slightly elevated above the surface of the skull indicating high intracranial pressure. After careful attention to hemostasis, the scalp incision was closed (fig. 5).

Postoperative course

Postoperatively, the course was uneventful. The visual acuity improved to finger counting at 12 feet within two weeks.

On September 22, 1942, a tonsillectomy was performed under ether anesthesia without complications. The patient was readmitted to the hospital on November 5, 1944, following minor trauma to his head, sustained the preceding day. A few hours after striking a glancing blow to his head on a door knob, he complained of headache, vomited, and became semistuporus. Examination 24 hours later revealed a semistuporous boy with a stiff neck, a temperature of 101°F., and without any focal neurologic signs. A spinal tap revealed a clear, acellular spinal fluid under a pressure of 150 mm. of water; sugar was present, and there was no elevation of protein. The blood count was W.B.C. 23,440, 77-percent polymorphs, and 23-percent lymphocytes. Within 24 hours, the boy was alert and coöperative and fully re-

Fig. 4 (Lisman). An anteroposterior X-ray view of the skull showing the convolutional atrophy and the increase in height.

covered; there were no relapses. The etiology of this episode is obscure. Skull X-ray studies at that time revealed only a small part of the operative site that was not completely filled in with new bone.

Reëxamination after five years

A reëxamination on August 28, 1946, revealed an alert, coöperative boy, aged 14 years. The skull had increased in size and its contours were more rounded (figs. 6 and 7). His physical stature was smaller than average. Psychometric studies gave him a composite I.Q. rating of 76 on the Bellevue scale. The classification of "borderline intelligence" was given with the note that this boy was handicapped by having only one eye

Fig. 5 (Lisman). An X-ray picture of the skull taken two weeks postoperatively showing the surgically produced fracture lines of the King operation.

which undoubtedly penalized him in the tests that required perception.

A radiographic examination of the skull (fig. 8) on this date showed: "The skull vault is small and of peculiar form. The bitemporal diameter is narrow. There is an old, healed fracture in the right parietal region; probably the result of a surgical procedure. There is slight increase in the convolutional markings. In a subject of this age, this degree of increase is without clinical significance. No pathologic changes are ap-

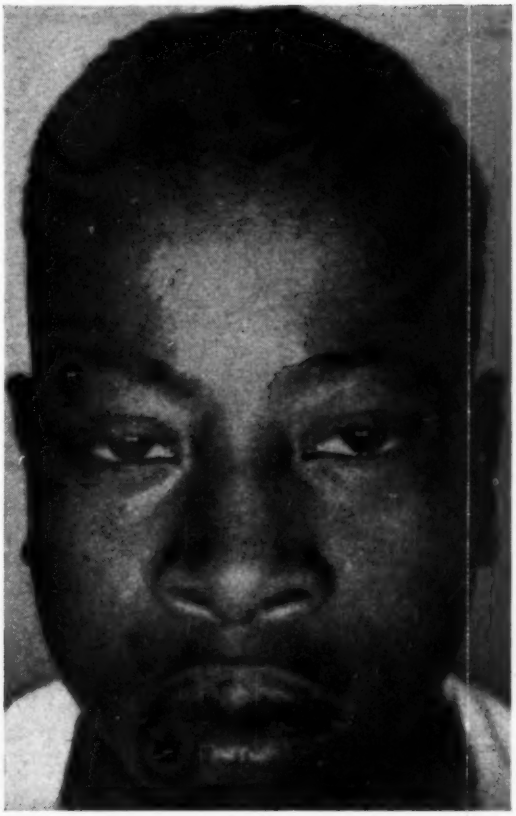

Fig. 6 (Lisman). Frontal view of the head taken when the patient was 14 years of age. It shows the increase in transverse diameter.

Fig. 7 (Lisman). Lateral view of the head at the age of 14 years.

Fig. 8 (Lisman). An X-ray study of the skull taken in September, 1946, when the patient was aged 14 years. Most of the fracture lines have closed. The skull has increased in size.

parent in the base of the skull, including the sella turcica. The optic foramina are within normal limits of size and form."

Ocular examination. There was primary optic atrophy of the right eye, with no light perception. Vision in the left eye was 20/20. The fundus was normal, as was the field. There was no exophthalmos as measured on the Hertl exophthalmometer.

Spinal tap. The initial pressure was 190 mm. of water. The Ayala index was 5.

Comment

Optic atrophy in oxycephaly is a result of one or all three of these factors: (1) small optic foramina, (2) papilledema, (3) distortion of the optic nerves by traction.

Most frequently mentioned, and yet most infrequently seen, is optic atrophy due to compression by a small optic foramen. Papilledema, while discussed, is reported only infrequently in case reports. It appears that the traction and distortion of the optic nerves subsequent to the marked skull deformity is the most important factor producing optic atrophy in synostosis craniae.

As is the case with maldevelopments of any kind, it is never easy to specify at what point departure from the normal becomes anomalous. Surely many persons with oxycephaly of mild degree grow to be normal adults and require no operative correction. If severe, however, the condition should be recognized in infancy and preventive measures should be taken. Faber and Towne[12] make an impassioned plea for preventive operation before the age of six months.

The palliative operations that have been recommended are: (1) Subtemporal decompression that gives only temporary relief. (2) The operation of linear resection that does not permit satisfactory symmetrical enlargement of the skull. (3) Resection of the optic canals if stenosis has occurred (rare). (4) The preventive operation of "linear craniectomy" of Faber appears to be the most rational; in this operation, channels of bone are cut at the side of the sagittal suture and another paralleling the coronal suture.

The cure of exophthalmos in oxycephaly has never been satisfactorily explained. The exophthalmos recedes immediately after operation, even though the orbital volume has not been increased.[9, 10] Probably, most of the exophthalmos is due to an increase in orbital contents by edema. The hypoplasia of the bones at the base of the skull in craniostenosis results in distortion of veins and interferes with the venous return from the orbit. After any operation that increases cranial volume, the exophthalmos decreases; this is probably due to better venous drainage from the orbit.

Summary

1. A case of craniostenosis is presented.

2. The King morcellation operation was performed and the patient was observed after five years.

3. The temporary improvement in visual acuity in the eye with optic atrophy was not maintained. Vision remained normal in the unaffected eye.

4. The intracranial pressure was partially controlled.

5. The etiology of optic atrophy is discussed.

654 Madison Avenue (19).

References

1. Faber, H. K.: Aldred Scott Warthin Memorial Volume. Ann Arbor, Michigan. 1927, p. 585.
2. Friedenwald, H.: Optic nerve atrophy associated with cranial deformity. Arch. of Ophth., 30:405, 1901.
3. Fletcher, H. M.: On oxycephaly. Quart. J. Med., 4:385, 1910-11.
4. Algyogyi, H.: Roentgenbilder lines Falles von Kraniostenose oder sogenanntem "Turmschadel." Wien. Med. Wchnschr., 58:1908, 1942.
5. Mehner, A.: Butrage zu den Augenveranderungen bei der Schadeldeformitat des sag. Turmschadels mit beisonderer Bericksichtigung, des Rontgenbildes. Klin. M. f. Augenh., 61:204, 1921.
6. Levine, Harry: Oxycephaly: Twenty-five year report of a case from an ophthalmic viewpoint. Arch. of Ophth., 27:1171-1176, 1940.
7. Faber, H. K., and Towne, E. B.: Early craniectomy as a preventive measure in oxycephaly and allied conditions. A. J. Med. Sc., 173:701-710, 1927.
8. Wilson, S. A. K.: Neurology. Baltimore, Williams and Wilkins Co., v. 2, pp. 1442-1445, 1940.
9. King, Joseph E. J.: Oxycephaly: A new operation and its results. Arch. Neurol. & Psych., 40: 1205-1219 (Dec.) 1938.
10. ———: Oxycephaly. Ann. Surg., 115:488-506 (April) 1942.
11. Gunther, H.: Ergehn d. inn. Med. u. Kinderh. 40:384, 1931.
12. Faber, H. K. and Towne, E. B.: Early operation in premature cranial synostosis for the prevention of blindness and other sequellae. J. Ped. 22:286-307, 1943.

SOME METHODS OF LID REPAIR AND RECONSTRUCTION*

V. Displacement of the canthi

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Cases of displacement of the canthi are not common and have been rarely reported. They are usually complicated cases because the trauma causing them must of necessity be extensive and severe. Thus, in the three cases listed below, not only were all the involved eyes lost but the first patient had an attendant cicatrical lagophthalmos and partial lid loss (fig. 1a) and the other two had a complicating cicatricial epicanthus (figs. 5 and 6).

Wheeler[1] has described a method of handling this type of traumatic deformity but his exposition of the technique is deceptively simple. It was undoubtedly a simple procedure in the hands of this master surgeon. However, as may be inferred from the reports below, the surgery required is usually extensive and occasionally formidable.

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Report of cases

Case 1

History. R. J. S. was injured on January 28, 1945, in Germany by mortar-shell fragments. He sustained wounds of the left frontal area of the skull, left eye and face, and right knee. The next day the left frontal sinus was exenterated, the left frontal brain lobe debrided, and the left eye enucleated. After convalescence, he was returned to this country. The defect in the skull was repaired with a huge tantalum plate (fig. 1b). He was then referred for plastic repair of the lids.

Examination disclosed (fig. 1a) an empty left socket and a severe cicatricial lagophthalmos, with the external canthus drawn up to an angle of 45 degrees. The outer half of the left upper lid was absent The lid was bound down to the subjacent tissues by cicatrices and was immobile.

Technique of repair. Anesthesia was ob-

tained by local infiltration with 1-percent novocaine with adrenalin. A Z-shaped incision was made as illustrated in figure 2a. All three arms of the incision were 3.5-cm. long. The upper two arms included the displaced external canthus between them. The lower

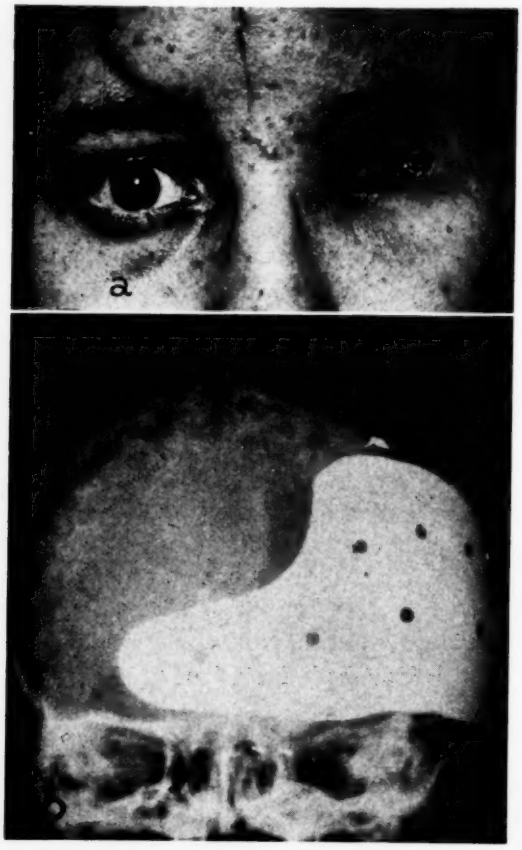

Fig. 1 (Fox). *Case 1.* (a) Left anophthalmos with dislocated outer canthus, cicatricial lagophthalmos, and loss of outer half of upper lid margin. (b) X-ray picture of skull showing extent of injury and tantalum plate.

two arms created a flap of skin from the lower lid. The incisions were carried down to the tarso-orbital fascia. Much scar tissue was encountered and resected. The external canthal ligament was difficult to identify but plenty of equivalent tough fibrous tissue was found to serve. In order to lower the external canthus and conjunctival sac to their normal positions the tarso-orbital fascia had to be incised to attain sufficient mobility (fig. 2b). The flaps were transposed and the ligament was sutured to the zygomatic bone behind the orbital rim at the same height as the external canthal ligament of the fellow eye with 3-0 chromic catgut sutures (fig. 2c). Subcuticular sutures were used to fasten the lower flap to the periosteum of the lower orbital margin and a double-armed stay suture of 3-0 black silk was passed through skin, external canthal ligament, and periosteum of the lower orbital rim, brought out through the skin of the cheek, and tied over oiled silk pegs (fig. 2d). The skin wound was closed with interrupted 4-0 black silk sutures. Figure 3a shows the repair six days

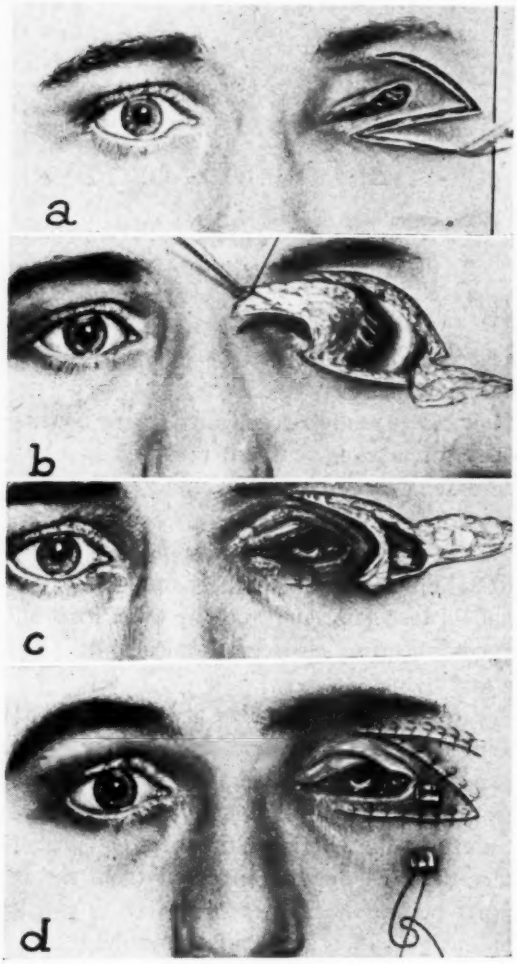

Fig. 2 (Fox). Technique used for repair of dislocated outer canthus in Case 1. For complete description, see text.

later before removal of the skin sutures. The canthal stay suture was removed on the 12th day.

Eight weeks later the outer half of the left upper lid was repaired and lashes grafted. Figure 3b shows the final result eight months after the first operation.

CASE 2

History. L. E. R. was injured by machine-gun fire in February, 1945. His left eye was destroyed, the left frontal, left ethmoid, and right frontal sinuses fractured, and the dura lacerated. The left eye was enucleated, the brain wound debrided, and the dura repaired by a graft of fascia lata. Convalescence was uneventful.

Examination. The patient was returned to this country where examination disclosed a vertical scar running across the forehead down through the medial end of the left brow and through the left inner canthus. The canaliculi were severed. There was a left cicatricial epicanthus with downward displacement of the inner canthus (fig. 5a).

Technique of repair. At operation under local anesthesia a Z-shaped incision was made as shown in Figure 4a with the displaced canthus enclosed by the incision angle BCD. The incision was carried down to periosteum. The two flaps thus created were mobilized by free incision of the tarso-orbital fascia and excision of fibrous tissue. The flaps were transposed so that flap ABC occupied position ADC and flap BCD was rotated up into position BAD (fig. 4b). The flap BCD (fig. 4a) included the internal canthal ligament and some surrounding scar tissue which was sutured to the periosteum of the anterior lacrimal crest with a double-armed 3-0 chromic catgut suture. Subcuticular sutures of the same material were used to suture the flaps to the periosteum of the upper nasal orbital rim. The skin incisions were closed with 4-0 black silk interrupted sutures.

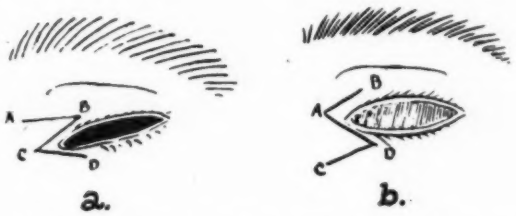

Fig. 4 (Fox). Incision and transposition of flaps used for repair of dislocated internal canthus in Cases 2 and 3. For complete description, see text.

Figure 5b shows the repair six days after operation before removal of the skin sutures. Figure 5c shows the patient eleven weeks after operation with a prosthesis in place.

Fig. 3 (Fox). *Case 1.* (a) Appearance six days after repair and before removal of sutures. (b) Appearance after repair of upper lid margin with lash graft and prosthesis in place.

CASE 3

History. E. F. R. was struck by an automobile in November, 1942. He sustained lacerations of the face, rupture of the left eye, and a fracture of the left maxilla. He was in a hospital until February, 1943, during which time his left eye was enucleated and his maxilla repaired by wiring.

Fig. 5 (Fox). *Case 2.* (a) Left anophthalmos with cicatricial epicanthus and downward displacement of the internal canthus. (b) Six days after repair, with sutures in place. Operative site still shows some postoperative edema. (c) Final repair with prosthesis in place.

Examination. When seen in September, 1944, he had a wide linear scar running from his forehead down the left side of his nose, over the left ala to the vermilion border of the upper lip. The left socket was anophthalmic. There was a left cicatricial epicanthus with the superficial skin knobby and scarred and a large, irregular mass of subcutaneous fibrous tissue involving the caruncle and the internal canthus which was displaced downward about 8 mm. The canaliculi were severed. There was a congenital epicanthus on the right side (fig. 6a).

Technique of repair. A Z-shaped incision was made as described in Case 2 with the two lower arms of the "Z" enclosing the dropped canthal ligament (fig. 4a). The resultant skin flaps were undermined and a mass of subcutaneous fibrous tissue exposed and resected. The dislocated canthal ligament and adjacent fibrous tissue were identified

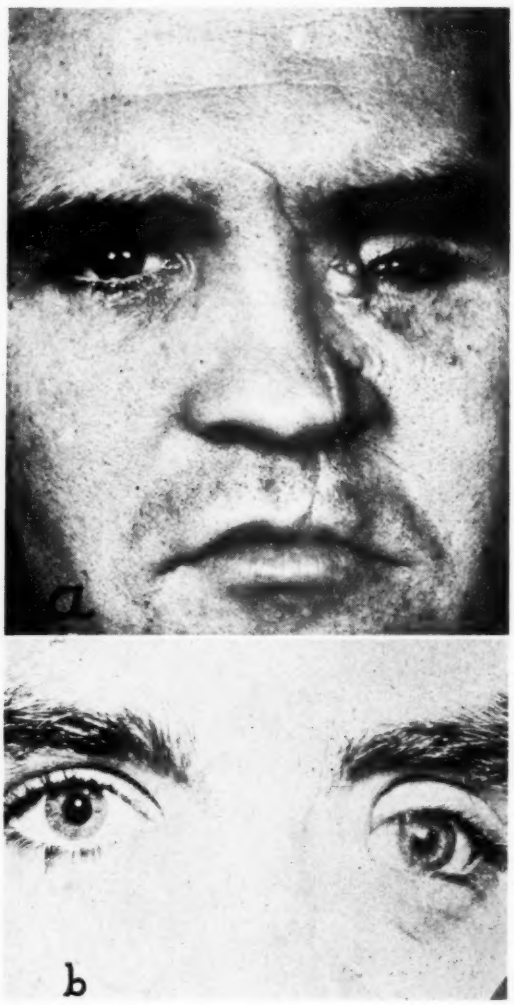

Fig. 6 (Fox). *Case 3.* (a) Left cicatricial epicanthus with downward displacement of the internal canthus. (b) Appearance after repair. Note absence of caruncle and bilateral epicanthus.

and freed. The external canthal ligament was cut, as recommended by Wheeler,[1] and the tarso-orbital fascia of the lower nasal orbital quadrant was incised to attain full mobility. The ligament was then rotated upward and sutured to the periosteum of the anterior lacrimal crest at the same height as the attachment in the right eye. Closure was made as described in Case 2. Recovery was uneventful. After healing it was seen that the canthus was back in normal position but the epicanthus persisted. A double-Z plasty was then performed after the method of Blair[2] to repair this. A secondary orbital implant and excision of the scar of the face were done subsequently to complete the repair.

The final result is shown in Figure 6b. Note that a trace of the epicanthus remains. This, however, just about matches the congenital epicanthus of the right eye and is not noticeable. What is obvious is the absence of the caruncle; this would have improved the result a great deal.

Discussion

One of the few cases in the literature describing this condition was reported by Roy[3] at the International Ophthalmologic Congress in 1922. This was a case of bilateral lagophthalmos with displacement of both external canthi upward. The repair here was also made by a relocation of the external canthal ligament although there was no preliminary "Z" incision. Apparently not so much scar tissue was encountered since this was not a traumatic case and hence less dissection was necessary to free the canthal ligaments. The result was excellent.

It must be emphasized that unless the ligaments or their equivalents are thoroughly mobilized the operation will be a failure. This requires sufficient incision of the tarso-orbital fascia so that the ligaments can be placed in proper position easily and without the slightest tension. When the internal canthal ligament is displaced, it is usually necessary to sever the attachment of the external canthal ligament to assure sufficient mobility.

It is also important to bear in mind the points of attachment of the two ligaments. The lateral palpebral ligament inserts into the orbital tubercle on the zygomatic bone which is behind the lateral palpebral raphe of the orbicularis. Thus it lies deeper than the medial palpebral ligament and does not form a prominence as does the latter. The medial palpebral ligament attaches to the frontal process of the superior maxilla *beyond* the anterior lacrimal crest and forms a prominence which is normally easily palpable. Despite this the attachment is deeper than one would suppose. This is important especially when the caruncle has been preserved. For unless the canthus is replaced back to its original position at the lacrimal crest the caruncle and semilunar folds are hidden and the optimum cosmetic result has not been obtained. This defect is especially noticeable in Case 3 where the caruncle has been lost, and illustrates this point nicely.

All fibrous tissue must be resected to reduce as much as possible the danger of displacement by scar-tissue pull during the healing process. Hence, also, the ligament must be firmly anchored in place.

There are two advantages in using the Z-incision technique in such cases. First, it tends to counteract the danger of healing scar-tissue pull, which may displace the canthus again, by using the skin flaps and skin sutures as well as subcutaneous sutures to counteract this tendency. Secondly, the transposition of skin flaps supplies skin tissue where most needed from adjacent sites; this is always a good rule in plastic surgery. In Case 1, it added tissue to a lagophthalmic lid which would have had to be obtained from somewhere else either by pedicle flap or free graft. The additional advantage here is that next to lid skin itself, skin from below the lower lid is nearest in appearance to actual upper-lid skin. Furthermore it has the advantage (in this case) of being somewhat heavier and less elastic and hence more like-

ly to counteract upward pull by healing scar tissue. In the last two cases this particular technique also happens to be an excellent method for the repair of epicanthus as well.

In general it is probably true that replacement of the external canthus is easier than the internal. This is due to the fact that the structures around the internal canthus are more important cosmetically and their destruction or improper repair will affect the final result much more adversely. Should the lacrimal passages be intact the problem then becomes much more delicate and difficult. Fortunately, or unfortunately, trauma in this area usually severs the continuity of the lacrimal passages and this problem is not often encountered.

Summary

Three cases of traumatic dislocation of the canthi with the methods of repair are reported.

The first was a case of upward displacement of the external canthus with cicatricial lagophthalmos.

The second and third cases showed downward displacement of the internal canthus with cicatricial epicanthus.

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References

1. Wheeler, J. M.: The Collected Papers of John Martin Wheeler, M.D. New York, Columbia University Press, 1939, pp. 425-427.

2. Blair, V. P.: Manual of Standard Practice of Plastic and Maxillofacial Surgery. Philadelphia, W. B. Saunders Company, 1943, pp. 184-185.

3. Roy, J. N.: Lagophthalmie bilaterale consecutive a la perte accidentelle de la peau du front et du cuir chevelu Blepharoplastie. Intern. Ophth. Congr., 1922, pp. 460-467.

EYE INJURIES FROM SO-CALLED NONCASUALTY WAR GASES

Report of cases

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The partial incidence[1] and eye lesions of the clinical[2-4,9] and experimental[6-8] burns caused by some of the casualty war gases during World War II have been described. On the other hand, little clinical information regarding the so-called noncasualty war gases has been presented, mainly because these gases do not ordinarily cause serious eye damage.

Tear gases

The most important tear gases are chloroacetophenone, chloroacetophenone solutions, and bromobenzylcyanide.

A soldier, aged 20 years, was admitted to the hospital at Edgewood Arsenal, Maryland, for burns of both eyes from a chloroacetophenone solution. This solution was dispersed as a spray from an experimental 3-gallon decontaminating apparatus attached to a jeep. The epithelial surfaces of both corneas were hazy and stained a bright green with a 2-percent alkaline fluorescein solution (6× loupe). The epithelium recovered and/or regenerated within 24 hours after treatment with homatropine and 10-percent albucid (sodium sulamyd, sodium sulphacetamide, or sodium-amino-benzene-sulfonyl-acetylimide).

A droplet of liquid bromobenzylcyanide placed in the eye of a rabbit produces corneal edema and ulceration with fluorescein staining extending even to Descemet's membrane. Usually the eye recovers in about 72 hours. Particles of solid chloroacetophenone entering the eye result in effects similar to those from droplets of bromobenzylcyanide.

In September, 1943, while riding a bicycle across a firing range in the European Theater Operations, a man was struck in both eyes with bromobenzylcyanide dispersed as a spray from a diving plane 50 to 75 feet overhead. Although he saw the spray leave the plane, the attack was unexpected and he was unable to shield himself. He felt drops enter both eyes and had instant severe pain, blepharospasm, lacrimation, and photophobia—to such an extent that he fell off his bicycle. During the next 45 minutes the spasm of the eyelids was so severe that it was practically impossible to irrigate his eyes. Three hours later, however, his subjective symptomatology subsided so that he was able to carry on with his usual duties. His eyes were examined by slitlamp an hour after contamination and the following findings were observed: Swelling of the lids, moderate edema and injection of the conjunctivas, bedewing (edema) of the corneal epithelial cells with superficial punctate staining of the lower two thirds of the corneas (fig. 1).

It is interesting to note that many of the patients during World War I were hospitalized for as long as two weeks, and the soldiers complained of photophobia and lacrimation for three to four weeks. Unless there is secondary infection or reëxposure, facts now indicate that even patients with the severest burns need not be hospitalized longer than 3 or 4 days.

If infection is able to get a foothold, however, the prognosis may be poor. Schmelzer[5] reported the case of a young man whose left eye was injured by a shot from a tear-gas pistol. On the 14th day the cornea became cloudy, the anterior chamber filled with pus, and blindness resulted.

During a demonstration at Edgewood Arsenal a second lieutenant threw a hand grenade filled with chloroacetophenone. The

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grenade failed to detonate. After a few moments the officer picked up the grenade and the explosion occurred. Both corneas were damaged to such an extent that permanent blindness resulted. This case is interesting in view of the fact that the degree of damage attributable to the physical force of the solution striking the corneas is an unknown quantity. In other words, if water, or any nonirritating solution, was placed in a grenade and exploded a few feet from the eyes, how much damage would there result to the corneas?

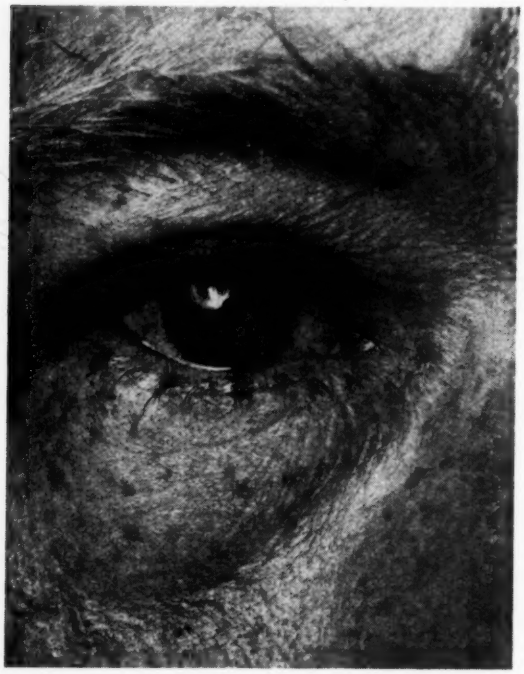

Fig. 1 (Uhde). Photograph taken one hour after contamination with bromobenzylcyanide from an airplane spray shows swelling of the lids and moderate edema and injection of the conjunctiva. Slitlamp examination showed bedewing of the corneal epithelium with superficial punctate staining of the lower two thirds of the cornea.

Rather severe allergic reaction may ensue from prolonged and/or repeated exposure to the tear gases. A white chemical engineer, aged 28 years, who was working on important tear-gas problems in the Technical Division, Edgwood Arsenal, developed a severe conjunctivitis, blepharitis, and contiguous dermatitis. These signs, and his symptoms, disappeared only after removal from the vicinity of the tear gases. Medicaments were useless. At the patient's request, since his work was important to the war effort, an attempt was made to keep him at his job. However, since the lesions always appeared after a reëxposure and became progressively worse after each succeeding exposure, the effort was finally given up three months after the appearance of the initial lesions.

Although irrigation was recommended in tear-gas splashed eyes, it appeared to have little value in the presence of the severe lid-spasm. The profuse tearing which results from the action of the gas per se is probably as adequate as any irrigation from a canteen. Soldiers should be warned not to rub their eyes because the corneal epithelium is damaged.

In the European Theater Operations, medical officers in forward echelons carried discs of flourescein, homatropine, and atropine for diagnostic and therapeutic care of corneal injuries. Discs were used because of their nonspillable (and perhaps less deterioration) advantage over solutions.

Choking gases

The common choking gases, or pulmonary irritants, are phosgene, chlorine, and chloropicrin.

On November 8, 1942, at Edgewood Arsenal, a Negress, aged about 19 years, was supposedly splashed in her left eye with phosgene, when a new employee became excited and dropped a tube of liquid phosgene on the table in front of the patient. Although the cornea did not stain with alkaline fluorescein (6× loupe), there was severe edema and hyperemia of the lids and conjunctiva with complaints of lacrimation, photophobia, and blepharospasm. The eye recovered in 72 hours without any specific treatment.

It is said that liquid chloropicrin when splashed upon the cornea will cause ulceration. In a lesser concentration chloropicrin is a strong lacrimator, although less effective

than the true lacrimators, and the flow of tears is the first symptom noted. It was a frequent and only symptom observed in these patients treated at Edgewood Arsenal.

Screening smokes

White phosphorus, sulfur trioxide-chlorsulfonic acid, and titanium tetrachloride are some of the screening smokes.

A case report,[1] illustrated by a photograph, of a severe white-phosphorus burn resulting in blindness has already been published. Phosphorus was used extensively during World War II, both as a casualty and noncasualty agent. The protection given by the ordinary eyeshields against white phosphorus varies considerably. When a 11-mg. piece of phosphorus, dried on blotting paper, was placed on an eyeshield and ignited with a hot wire, penetration occurred in 10 seconds. On the other hand, on another occasion under similiar conditions, a 12-mg. fragment penetrated an eyeshield in 3.2 seconds (fig. 2). Even though the penetration time is rapid in some instances (when the smoke is disseminated from shells or bombs, the dispersal force may tend to diminish the penetration time even further), the protection afforded probably suffices to permit the lid reflex adequate time to act and protect the eye against a destructive burn.

On November 19, 1942, a white man, aged about 37 years, was treated for sulfur-trioxide-chlorsulfonic-acid burns of his left eye, left side of his face and neck, and left forearm after a "burster-well" in a leaking shell exploded suddenly. He ran immediately under a shower and his left eye and skin were thoroughly washed. The eye burned and lacrimated but did not otherwise particularly disturb the patient until about 24 hours later at which time the lids were so swollen that he was unable to see. Other than this swelling of the lids and conjunctivas, the eye appeared normal. The swelling subsided in four days and the skin burns healed in seven days.

The following case history stresses two important facts: (1) that a so-called noncasualty war gas may at a point of dispersal cause considerable damage and, (2) that it is potentially dangerous to give an eye patient a local analgesic for self-medication, even though it contains an antiseptic. The pain may be relieved but the pathologic processes may progress.

In February, 1943, in a southern camp,

Fig. 2 (Uhde). Antigas eyeshield showing penetration made by a flaming 12-mg. fragment of white phosphorus in 3.2 seconds.

a master sergeant, aged 24 years, splashed titanium tetrachloride into his left eye while removing a cork from a bottle. The eye was irrigated immediately and for about five minutes with 2-percent sodium bicarbonate. A medical officer gave him an ointment of metaphen (1:3,000) with butyn (2 percent) with instructions to use it freely. Twenty-four hours later while en route to Edgewood Arsenal, the sergeant observed that his lids were severely swollen and that he had blurred vision with severe pain (relieved by the ointment), lacrimation, blepharospasm, and photophobia. Examination three days after the eye was contaminated showed severe inflammation of the lids and conjunctiva, numerous conjunctival and subconjunctival hemorrhages, central corneal ulceration, 4 mm. in diameter, which stained bright green with fluorescein and which extended into the stroma, haziness (infiltrates and edema) of most of the remaining corneal tissue, and reflex miosis. The aqueous was clear. The patient was placed in a dark room; the pupil was dilated with a mydriatic, and albucid (10 percent) was instilled every

four hours. The ulcer healed slowly, leaving a faint nebular scarring in the visual axis.

Incendiary agents

The incendiary agents produce a heat burn when brought in contact with the body. Some of the principal incendiary agents are thermite, white phosphorus, combustible oil, and combustible metal incendiaries.

Fig. 3 (Uhde). Photograph of a human eye taken 24 hours after being burned with thermite. The patient was wearing spectacles which were covered with a thick layer of metallic-like matter after the accident. Photograph shows charred cilia and swelling of the lids and conjunctiva. There was bright-green fluorescein staining of the visual axis of the cornea with either a pale-green staining or haziness of the remaining corneal surface.

In February, 1943, a T/4, aged about 27 years, was treated for thermite burns of both eyes, neck, and both hands. He was drilling a hole into an experimental bomb which unexpectedly ignited. Fortunately he was wearing spectacles which were covered with a thick layer of metalliclike material after the accident. Examination showed burns of the face, neck, and hands, charred cilia (fig. 3), hyperemia, and chemosis of the lids and conjunctivas, bright-green fluorescein staining of the visual axis of the right cornea, with either a pale-green staining or haziness of the remaining corneal surface, and superficial punctate staining of the left cornea. After treatment with a mydriatic and sterile liquid petrolatum in a dark room for 24 hours, the corneal surface no longer stained and the epithelium appeared normal (6× loupe).

That the antigas eyeshields give considerable protection against the incendiaries was shown in the discussion on white-phosphorus burns and by the fact that an eyeshield resists the flame of a Bunsen burner for 3½ seconds (fig. 4).

The treatment and prognosis of an incendiary burn is that of any heat burn of the same degree and extent. The eye should be irrigated gently with normal saline, and a mild ointment or oil and a mydriatic should be instilled. The lids should be closed with a pad of dampened gauze immediately over them and then with a dry pad held with adhesive, since the best dressing for the cornea

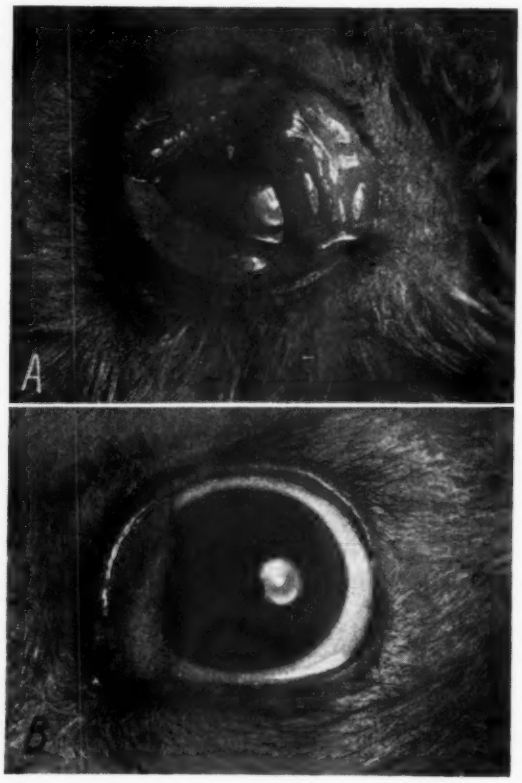

Fig. 4 (Uhde). (A) photograph of a rabbit's eye taken 24 hours after exposure to the flame of a Bunsen burner for 3½ seconds. (B) control eye showing protection given by an antigas eyeshield on exposure to the same flame for 3½ seconds.

is the lid. Cocaine or other local anesthetic should not be used, as anesthesia of the cornea might lead to damage.

Summary

Case reports of eye injuries due to splash burns from chloroacetaphenone, chloroacetophenone solution, bromobenzylcyanide, phosgene, white phosphorus, sulfur-trioxide chlorsulfonic acid, titanium tetrachloride, and thermite are presented. Treatment is discussed.

Nichols General Hospital (2).

References

1. Uhde, G. I.: Some personal experiences in the treatment of war gas burns of the upper respiratory tract during World War II. Mil. Surgeon, **98**:483 (June) 1946.
2. ———: Mustard-gas burns of human eyes in World War II. Am. J. Ophth., **29**:929 (Aug.) 1946.
3. ———: Arsenical eye burns: A case report. Am. J. Ophth., **29**:1090 (Sept.) 1946.
4. ———: Burns of the upper respiratory tract and eyes from a nitrogen-mustard gas (1149): A clinical study. Arch. Otolaryng., **44**:701 (Dec.) 1946.
5. Schmelzer, H.: Injuries of the eyes by chemical warfare methods and first aid treatment. München. med. Wchnschr., **84**:770, 1937.
6. Mann, Ida, and Pullinger, B. D.: A Study of Lewisite lesions of the eyes of rabbits. Am. J. Ophth., **29**:1215 (Oct.) 1946.
7. LaMotte, W. O., and Leopold, I. H.: The pathologic changes in rabbit eyes resulting from exposure to liquid nitrogen mustards. Am. J. Ophth., **29**:1553 (Dec.) 1946.
8. Hughes, Jr., W. F.: Treatment of Lewisite burns of the eye with dimercaprol ("BAL"). Arch. Ophth., **37**:25 (Jan.) 1947.
9. Scholz, R. O., and Woods, A. C.: Relapsing and chronic ocular lesions following mustard gas (trichloroethyl sulfide) burns. Arch. Ophth., **37**:139 (Feb.) 1947.

A PROCEDURE TO FACILITATE INTRACAPSULAR FORCEPS EXTRACTION OF INTUMESCENT CATARACTS*

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The procedure consists in puncturing the lens capsule with a fine needle near the equator at the 12-o'clock position. A small amount of pultaceous cortex is thus permitted to escape, after which the capsule, no longer tightly stretched, can be picked up with smooth capsule forceps. While this procedure is not original, it was stumbled on independently by us. It has received scant mention in the literature available to us, and there are no articles concerning it in the American literature. Although our experience with it is limited to seven cases, the uniform success following its use, its simplicity, and its apparent lack of recognition justify, we believe, this brief discussion.

We fell on the procedure by accidentally pricking the lens capsule with de Wecker iris scissors in performing a peripheral iridotomy. To our surprise the wound in the capsule remained localized throughout the extraction, the capsule became relatively flaccid and was picked up easily with Arruga capsule forceps, and the extraction was intracapsular. In our next case of intumescent cataract, a Graefe knife was intentionally used to puncture the capsule; however, the incision enlarged itself and the lens could not be extracted in the capsule. Since then we have used a fine needle to make the puncture, with resulting intracapsular extraction in all of the seven cases so far attempted. Three of these extractions were done through round pupils.

DISCUSSION IN LITERATURE

Lindner[2] was probably the first to use the procedure. In 1942, he recommended the use of a Graefe knife to prick the capsule when the latter is very tense, allowing some cortex to escape so that the capsule may be grasped more easily with the forceps. That this article was not abstracted in English until 1946 is undoubtedly due to the inaccessibility of German publications during the war. Traquair,[7] in 1944, in discussing a paper on cataracts, mentioned that intumescent cataracts can be extracted in the capsule, if the capsule is pricked with a needle before an attempt is made to grasp it. Sedan and Sedan-Bauby,[5] in 1946, reported its use in seven cases, all successful. They, too stumbled on the procedure by accident, in almost the same way as we did. In performing a peripheral iridectomy they accidentally tore the capsule with fine-toothed iris forceps, with the same surprising result. They use the puncture only after they have failed to deliver the lens by the Smith technique.

That intumescent cataract is particularly difficult to extract in the capsule is well known. Elschnig,[1] who was one of the earliest proponents of intracapsular extraction with capsule forceps, stated that the intracapsular extraction is not suitable in intumescent cataract, or is successful in but a small percentage of cases. He was of the opinion that this is the only stage of senile cataract in which the operation should be postponed for at least several weeks until the anterior chamber is almost normal, or at least has become deeper. In the beginning of intumescence the capsule cannot be grasped. When the lens becomes dehydrated in the transition to maturity, it is easily grasped. He also stated that if an iridectomy is performed, the lens may be delivered in the capsule in a small percentage of cases by the Smith or Smith-Pagenstecher technique. Meller[3] in one of the most recent textbooks on surgery is still of the opinion that intracapsular extraction is contraindicated in in-

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tumescent cataract. Our limited experience leads us to believe that this contraindication is not valid if the lens is punctured with a fine needle before being grasped with forceps. Moreover, the punctured lens may be delivered through a round pupil smaller than is otherwise required, by using combined traction and pressure.

The erisophake is considered suitable for intracapsular extraction of intumescent lenses. In this regard Ribeiro,[4] in an exhaustive article on suction extraction of cataracts, points out that for intumescent cataracts one should use a large suction cup and a low degree of suction. A small suction cup applied to a small area requires a greater amount of suction which will undoubtedly break the capsule. He also points out that the larger the suction cup, the more difficult it is to manipulate because it can easily include the edge of the iris and produce an iridodialysis. Spaeth[6] is of the opinion that regardless of the operator who is using the erisophake, there is a greater incidence of vitreous loss with this procedure, than with extraction using forceps. The puncture offers an alternative to the use of erisophake and permits extraction of intumescent lenses with forceps.

Operative technique

The technique is simple. No additional paraphernalia other than a sharp, fine-gauge (No. 25 or No. 26) needle is needed. The puncture is made just before the lens is to be grasped with forceps. The site of puncture is in the anterior capsule near the upper edge. It is made through a peripheral iridotomy, peripheral iridectomy, or through a total iridectomy. Some resistance is offered to the point of the needle by the lens capsule, and the lens is felt to move backward a little just before the needle penetrates the capsule. Once the capsule is punctured, the needle is at once withdrawn, and is followed by a small amount of milky-white fluid. The relaxed capsule is now easily grasped in its lower or upper third and the extraction completed by using traction combined with pressure. No attempt is made to seal off the hole in the capsule by grasping its edges with the lens forceps.

Sedan[5] states that Charles Thomas of Nancy told him in a personal communication that he had used this type of puncture, but had made it with a cystitome in the lower third of the anterior capsule and had then attempted to close off the wound by grasping its edges with the lens forceps. He succeeded in 8 of 12 cases.

We feel that the small wound in the capsule may act as a safety valve during the extraction particularly when it is being done through an intact sphincter with a not well-dilated pupil. In one case of ours this was strikingly illustrated. The capsule was punctured as described above, after an attempt to grasp it with forceps had been unsuccessful. As always, a milky-white fluid escaped from the wound in the capsule. The pupil in this case was round and narrow. Some resistance was felt in loosening the lens from the zonule and in pulling it into the rather small pupil, when suddenly all resistance was felt to disappear. It was thought at this point that the capsule had torn. The capsule was then drawn through the pupil and out of the eye by putting one forceps after another upon it in a hand over hand fashion as described by Verhoeff, and to our surprise, it emerged intact almost empty except for a thin yellow nucleus. This seems to indicate that the capsule and the solid portion of the lens which it surrounds may be extracted through a pupil of a diameter slightly greater than that of the solid portion of the lens, although considerable pultaceous cortex may be lost in the process.

The puncture is not indicated, of course, in lenses with senile sclerotic changes. In one case, we experimentally inserted a needle into a completely sclerosed lens. It felt like hard clay. Upon withdrawl of the needle nothing issued from the wound in the capsule. The capsule was easily grasped with forceps and the extraction was intracapsular. While the procedure has no advantage in a

sclerosed lens, in this particular case it did no harm. A large series of cases may demonstrate that the puncture does not prejudice the successful intracapsular extraction of any lens upon which it is performed.

We have had no complications following this procedure. The small amount of pultaceous cortex which ordinarily escapes from the wound in the capsule is probably pushed out of the eye ahead of the lens. We have not practiced routine irrigation of the anterior chamber after this kind of extraction and have had no iritis or other complications in the seven cases in which we have used it.

Summary and Conclusions

1. Puncture of the capsule of the intumescent lens near the equator at the 12-o'clock position facilitates intracapsular extraction with forceps.

2. No complications result from the use of this procedure.

3. Intracapsular extraction of intumescent cataract through a round pupil is made possible by this procedure.

1117 Medical Arts Building (2).

References

1. Elschnig, A.: Die Intrakapsulare Starextraktion. Berlin, Julius-Springer, 1932, p. 51.
2. Lindner, K.: Cataract operation, old and new methods. Klin. M. f. Augenh., **108**:567 (Sept.-Oct.) 1942. Abstracted in Am. J. Ophth., **29**:498 (Apr.) 1946.
3. Meller, J. and Bock, J.: Augenärztliche Eingriffe. Vienna, Springer-Verlag, 1946, p. 237.
4. Ribeiro, R.: La aspiracion al servicio del tratamiento de la catarata a traves de los siglos. Arch. Soc. oftal. hispano-am., **5**:434 (June) 1945.
5. Sedan, J., and Sedan-Bauby, S.: Sur la Microponction Prealable de Certaines Cataractes Intumescentes et Insaisissables, Rendant Ulterieurement Possible et Aisee L'Extraction Totale a la Pince. Ann. d'Ocul., **105**:35 (Jan.) 1946.
6. Spaeth: Principles and Practice of Ophthalmic Surgery. Philadelphia, Lea & Febiger, 1944, p. 652.
7. Traquair, H. M.: Tr. Ophth. Soc. U. Kingdom, **63**:314, 1944.

NOTES, CASES, INSTRUMENTS

FIBRINOUS EXUDATIVE CYSTS OF THE IRIS

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Dramatic recoveries of iridocyclitis after the administration of penicillin have recently been reported, such as the case by Weizenblatt.[1] Other types of therapy having been simultaneously used, the effectiveness of the penicillin is not easy to evaluate. In the instance to be reported, arsenicals and bismuth used for syphilis had apparently produced an acute hepatitis, although causing both the blood and spinal serologic tests to be negative. The cysts, which subsequently appeared when the constitutional reactions of an acute hepatitis were in a process of subsiding, were inflammatory in character and responded to penicillin therapy.

It was suggested that the cysts arose from the anterior iris crypts at the site of the posterior synechias. Duke-Elder[2] described similar spontaneous cysts of exudative nature which may arise from clefts in the iris.

REPORT OF A CASE

A 24-year-old white man entered the hospital on September 14, 1946, complaining of general malaise, increased fatigability, and discoloration of the skin and sclera, which began four weeks before admission. Later, on October 17, 1946, he developed an iridocyclitis, complicated by the formation of fibrinous exudative cysts of the iris.

History. The previous history was unimportant except for the fact that, four months prior to entrance, in April, 1946, he had a penile chancre followed by a positive serologic test. He received injections of bismuth and an arsenic preparation, each once a week, up to the week before admission to the hospital; this included three weeks after the appearance of a generalized jaundice.

Family history. The family history was irrelevant except that the mother had died from an embolus from varicose veins of the legs. Past history was otherwise irrelevant.

Physical examination. A young white man, deeply jaundiced and not acutely ill, with no temperature, presented himself.

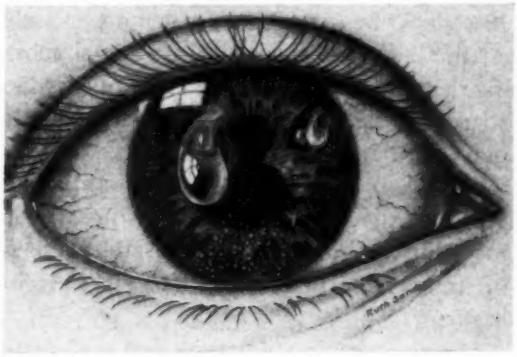

Fig. 1 (Thomas and Burnside). Fibrinous exudative cysts on the iris.

Conjunctiva and sclera are yellow, pupils equal, dilate and react to light and accommodation. Eyegrounds are normal in appearance. All systems were negative except for slight bilateral cervical and inguinal adenopathy. The abdomen was described as soft, no rigidity, but with slight tenderness in the right upper quadrant. The liver was palpated some two to three finger's breadth below the costal margin, although the edge was not distinctly felt. No other organs were palpable.

Treatment. Because it was assumed that the patient had an acute drug hepatitis from arsenic, he was given treatment including methionine, choline, high-carbohydrate, high-protein, and low-fat diet, brewer's yeast, liver extract, and bed rest.

Eye symptoms. Recovery proceeded uneventfully until October 16, 1946, when the patient complained of slight pain and diminution of vision in his right eye. No manifest refractive error was present and the

visual acuity was: O.D., 20/60; O.S., 20/20. Tension to finger palpation was normal.

On October 17, 1946, gross examination revealed a slight edema of the lids with purplish discoloration. The conjunctiva was edematous with the presence of moderate ciliary injection. The cornea was slightly cloudy. The pupil was irregular and fixed, about 3 mm. in diameter. A clear grayish-yellow, tear-drop appearing structure hung from the anterior surface of the iris at the 10-o'clock position over a definite nodule. At the 2-o'clock position, a nodule supporting a very small similar type of cystlike structure was present. After dilation of the pupil, two posterior synechias were noted at the 10- and 2-o'clock positions. Ophthalmoscopic study of the right eye was unsatisfactory due to the cloudy cornea and presence of inflammatory products in the anterior segment.

Biomicroscopic study revealed the cornea to be edematous throughout, with many irregular folds in Descemet's membrane. Numerous keratic precipitates of a dark-brown color covered the lower fourth of the endothelium of the cornea. The aqueous was filled with many cells and clumps of cells seemed to be moving freely. A moderate engorgement of the entire iris gave it a muddy appearance. At the sites of the synechias, the iris vessels were strutted over an iris segment which was definitely elevated.

Two pedunculated cysts appeared to rise from a small anterior iris nodule at the 10-o'clock position. A common stalk was the origin of both. The larger cyst had a thin, transparent, veil like, outer wall and was of grayish color with particles of uveal pigment and inflammatory cells adherent to it. This larger cyst was approximately 4.5-mm. long, 2.5-mm. wide, and its depth allowed its surface to be almost in contact with the cornea. A similar miniature cyst arose from the same nodule and over the larger cyst. Both hung across the base of the firmly fixed posterior synechias. At the 2-o'clock position and medial to the adjacent synechias was a small reddish nodule 1 by 1.5 mm., and overlying this was a small, half-moon shaped, transparent cyst with a wall similar to those previously described.

Therapy. Instillations of atropine and 10-percent neosynephrin failed to release the synechias or to dilate the pupil satisfactorily. This treatment was followed the next day by a subconjunctival injection, but the synechias held firm. Penicillin was started with 5,000 u. every three hours, and this was increased daily until 100,000 u. were given at each intramuscular injection. In 48 hours the cysts were reduced to half the original size. By October 24, 1946, eight days later, they had disappeared along with the synechias, following a repetition of a subconjunctival injection of atropine and adrenalin. Only a small indistinct nodule remained at the sites originally described. By November 1, 1946, no evidence of active pathologic processes of the iris was seen except a slight iris atrophy. A few keratic precipitates remained, but no free cells were noted in the aqueous.

Laboratory findings. Blood Wassermann and precipitation tests were negative. Spinal serology was negative and a colloidal gold test was 0000000000. Cell count showed three polymorphs per cm. First urine specimen: dark brown color; turbid; reaction acid; specific gravity, 1.011; albumin trace; sugar negative. W.B.C., rare; R.B.C., 2-3 (high-powered field), many granular casts, bile strongly positive, urobilinogen positive.

Feces: bile acids were negative. On September 28, 1946, cephalin cholesterol showed a flocculation of two plus. The icterus index fell from 135.6 on admission to 13.7 when dismissed on November 6, 1946. X-ray studies of the abdomen and chest were negative.

Comment

An unusual inflammatory cyst of the anterior chamber, associated with an iridocyclitis and causing little pain, was suspected of being luetic in origin because of the dramatic response to penicillin given systemically.

It was believed that the jaundiced state of the patient was due to liver damage produced by the administration of arsenicals, since cessation of the hepatitis began with the stopping of the arsenic therapy. Therefore, the iridocyclitis was probably due to a luetic infection, although the serologic tests on admission were negative. The large doses of penicillin supplied sufficient concentration to the site of the inflammation of the anterior chamber; and, even though large amounts of inflammatory exudate were present, an unusually rapid response occurred. This also suggests that, when anterior-segment inflammatory processes are sensitive to penicillin therapy, they have an excellent prognosis when the drug is given parenterally.

Medical Arts Building (1).

REFERENCES

1. Weizenblatt: Penicillin in treatment of acute endophthalmitis, Arch. Ophth., 36:736 (Dec.) 1945.
2. Duke-Elder: Textbook of Ophthalmology, St. Louis, Mo., C. V. Mosby Co., vol. 3, p. 2438.

CLINIC FOR BINOCULAR PROBLEMS*

THREE EMMETROPIC PATIENTS TREATED WITH ANISEIKONIC GLASSES OVER 8- TO 10-YEAR PERIODS

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Aniseikonia usually arises when anisometropia or unequal astigmatism is corrected with ophthalmic lenses. The fact that it is measured occasionally in emmetropic patients with ocular symptoms which are otherwise inexplicable is of great theoretical interest. As suggested by Hughes,[1] the seat of the anomaly in these patients may be in the comparative density of retinal sensory elements in the two eyes, or in the neurologic processes in the ocular cortex. The following cases are cited as examples.

CASE REPORTS

CASE 1

S. B. W., a white woman, was first seen at the age of 15 years, on August 31, 1938. Her complaint was fatigue of the eyes after reading, movies, or riding in a car. After an hour's study, there was headache in the frontal region which could be relieved by resting her eyes one-half hour. The onset of this complaint was in 1935 following treatment for sinusitis. She had worn these glasses for 18 months without relief: R.E., −0.12D. cyl. ax. 180°, 20/15; L.E., −0.25D. cyl. ax. 5°, 20/15.

External examination and ophthalmoscopy were found to be normal. The subjective noncycloplegic refraction was: R.E., −0.25D. cyl. ax. 150°; L.E., −0.25D. cyl. ax. 40°. Diplopia tests for phoria were negative both distant and near.

Fusional amplitudes were: Distant: Divergence, 9/7$^{\Delta}$ (break and recover). Convergence, 10/8$^{\Delta}$. Vertical, ±2/1$^{\Delta}$ (+ is B.D. right). Near: Divergence, 21/16$^{\Delta}$. Convergence, 40/18$^{\Delta}$. Vertical, ±3/2$^{\Delta}$.

Tests for aniseikonia on the ophthalmoeikonometer without the refractive correction showed the need for magnifying the image of the right eye by 1.0% overall.

After wearing the prescription: R.E., 0.00D. sph. with 1.0% overall; L.E., 0.00D. sph., for seven weeks, she reported relief of her fatigue and headache.

In October, 1941, she returned stating that the glasses had done very well for two years, but since she had entered a secretarial school, she had begun to get headaches over the right eye after reading or when watching a movie.

Second examination. External and ophthalmoscopic examinations were normal. Visual acuity without glasses was 20/15 O.U. Keratometer readings showed: R.E.,

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42.37/10, 42.62/100, with a −0.25D. cyl. ax. 10°; L.E., 42.62/35, 43.37/135, with a −0.75D. cyl. ax. 35°. Subjective noncycloplegic refraction was: R.E., −0.25D. cyl. ax. 90°; L.E., −0.25D. sph. ⌒ 0.25D. cyl. ax. 35°.

Diplopia tests showed orthophoria for both distant and near vision. The fusional amplitudes had increased in three years to: Distant: Divergence, 12/10$^{\Delta}$. Convergence, 16/12$^{\Delta}$. Vertical, ±4/3$^{\Delta}$. Near. Divergence, 18/16$^{\Delta}$. Convergence, 24/20$^{\Delta}$. Vertical, ± 6/4$^{\Delta}$.

Tests for aniseikonia on the ophthalmo-eikonometer without refractive lenses showed: 0.25% overall combined with 0.25% ax. 90°. Tests on the space eikonometer[2] showed: ax. 90°: R.E., 1.0% ax. 180°: L.E., 0.75%; delta: −0.3° (which measurements correspond to an aniseikonic correction of R.E., 1.75% meridional, ax. 130°).[3] The patient was given the prescription: R.E., 0.00D. sph. with 1.5% ax. 135°; L.E., 0.00D. sph. which she reported in a letter of June 14, 1943, again relieved her complaints. On November 20, 1943, she returned to the clinic at the insistence of her father who thought she had been using her eyes too much. Her refractive and aniseikonic conditions were found to remain the same.

Case 2

L. M. S., a white man, aged 33 years, was a gymnasium instructor. He was first seen in December, 1936. His chief complaint was headache in the frontal and occipital region of 12 years' duration. The headaches were almost continuous, although he had a few days relief at intervals. The headache had no apparent relation to physical fatigue or any activity. There was no train or car sickness. He would sometimes wake up with the headache, feeling physically exhausted. The headaches often interfered with rest at night. He did much reading in spite of his headache. He had tried wearing glasses (presumably plus for near) and also tinted lenses without relief. After one-half hour's reading, his eyes would tire and pull. Objects stared at seemed to fade in and out. There was photophobia, burning and lacrimation, blinking and blepharospasm when he tried to concentrate on a moving object.

History. Since the age of 11 years, he had had "sick headaches" with nausea and partial temporary field changes. These came once or twice a year, but had not occurred for the past three years. In 1930, the patient was treated for acute conjunctivitis with "the wrong prescription." He stated that due to this treatment, he had to keep the eyes bandaged for two weeks, and wear dark glasses for several weeks following.

The family history was negative except that his mother had had "sick headaches" all her life.

Examination. External and ophthalmoscopic examinations were normal. Keratometer readings were: R.E., −0.37D. cyl. ax. 160°; L.E., −0.12D. cyl. ax. 180°. Subjective noncycloplegic refraction showed: R.E., +0.25D. cyl. ax. 60°, 20/15; L.E., +0.25D. cyl. ax. 175°, 20/15. By the diplopia test, there was 1$^{\Delta}$ esophoria for distant vision, and 5$^{\Delta}$ exophoria for near. He was given a prescription for +0.75D. sph., O.U., which he wore for a week. He reported no relief whatever.

When tested on the ophthalmo-eikonometer, he was found to have slight left meridional aniseikonia:

R.E., +0.50D. sph., L.E., +0.50D. sph., with 1.0% magnification axis 180°. After wearing this prescription for a month, he reported that the eyes were more relaxed, and there was less blinking and smarting of the eyes.

Second examination. On reëxamination on April 27, 1937, he was found to be emmetropic, and tests on the ophthalmo-eikonometer without refractive lenses showed: R.E., 0.75% ax. 90°; L.E., 1.0% ax. 180°. He was given this prescription in fitover lenses over planos. These proved to be superior to his previous glasses, so he was given the prescription in permanent form.

On December 6, 1937, he appeared at a clinic seminar conducted by the late Dr. Bielschowsky. The patient reported that he was no longer aware of headaches at all. He had often checked himself to be sure the headaches were real, by temporarily removing the glasses. He had occasionally tried to read a few minutes without the glasses, but invariably suffered a headache. He was no longer annoyed by photophobia, burning of the eyes, or strain on watching moving objects. The reading required in his work no longer gave him such discomfort.

In commenting on the case, Dr. Bielschowsky said, "It is hard to understand how an anomaly can cause trouble some times, and can then disappear, and come back." (He meant prior to wearing the glasses.) "I think one has to assume that where nothing can be found but aniseikonia, one has to wonder if other factors have to be considered, such as physical fatigue, excitement, or worry, because if the aniseikonia would be the only anomaly we would not understand how there could be any free intervals at all."

Third examination. On February 1, 1946, the patient was again examined. He had been wearing the plano-aniseikonic glasses for nine years. His vision had remained good, but he was complaining of difficulty with reading. (Aged 42 years, this visit.) He complained that his migrainelike headaches had returned. There were premonitory flashing lights. In eight days, he had had five severe headaches. He was working long hours in spite of frequent colds and fatigue.

External and ophthalmoscopic examinations were normal. The keratometer reading was: R.E., 44.75, 45.50, with a −0.75D. cyl. ax. 180°. L.E., 44.75, 45.25, with a −0.50D. cyl. ax. 180°. The subjective refraction was: R.E., −0.50D. sph., 20/20+; L.E., −0.25D. sph., 20/20+. The dynamic crossed-cylinder test indicated that an add for near was required: +1.00D. sph., O.U. at 16 inches.

Diplopia tests showed orthophoria for distant vision, and 5$^{\Delta}$ exophoria for near. The ophthalmo-eikonometer with the above refractive prescription measured: R.E., 1.5% ax. 90°.

He was given a pair of glasses: R.E., −0.50D. sph. with 1.25% ax. 90° (in fitovers); L.E., −0.25D. sph., and an additional pair of fitovers for reading, consisting of +1.00D. sph., O.U.

On June 13, 1946, he reported that the glasses were quite satisfactory. There had been a few headaches since he received them, but they were not severe. Therefore, the above prescription was made up in permanent bifocal form.

Case 3

G. K., a white man, was first seen at the age of 16 years, in December, 1936. His chief complaint was slow reading. He admitted some fatigue after prolonged reading, but seldom had headache or eye strain. He had been examined by an ophthalmologist three years previously, and had been given convergence exercises.

History. His past history was normal. He had a sister with squint, and a brother with myopia and color blindness. A complete physical examination of the patient was found negative. External and ophthalmoscopic examinations of the eyes were normal.

Keratometer readings were: R.E., 42.00, 42.25, with a −0.25D. cyl. ax. 180°; L.E., 42.12, 42.37, with a −0.25D. cyl. ax. 180°. The subjective noncycloplegic refraction was: R.E., +0.50D. sph. ⌒ +0.25D. cyl. ax. 180°, 20/15; L.E., +0.50D. sph. ⌒ +0.25D. cyl. ax. 180°, 20/15.

There was esophoria of 2$^{\Delta}$ for distant vision, and an exophoria of 2$^{\Delta}$ for near. Dominance was left eye, right hand. Tests on the ophthalmo-eikonometer without refractive correction showed: R.E., 1.75% ax. 90°; L.E., 0.75% ax. 180°. Next day the test was repeated and R.E., 1.75% ax. 90° was found, so he was given this prescription in a fitover over plano lenses.

After a month, he reported improvement in his reading, and less fatigue. He was

tested five times on the ophthalmograph, which is an instrument that photographs eye movements while reading unfamiliar material. This test is considered unreliable when used in this way, but it did seem to indicate improved reading while wearing the aniseikonic glasses.

Second examination. He was reëxamined in December, 1937. On tests with the ophthalmo-eikonometer identical readings were found. He stated that his glasses had helped him in his school work. His school registrar reported February 24, 1937: "G. K. is doing a good job. He tells me that he feels that his glasses are helping him appreciably. You will be interested to know that he says his reading speed has increased about 50 percent already. Although he is undemonstrative and rarely shows enthusiasm, he is greatly encouraged by this development."

On September 15, 1943, a letter was received from G. K. from an Army camp. He requested another pair of his plano-aniseikonic glasses. In January, 1946, he again wrote, stating that his glasses had worn out, and that he wished to get another pair of the same prescription.

SUMMARY

Three cases of aniseikonia in emmetropia are reported, showing relief of symptoms from 8 to 10 years each. Of these cases, one was studied by the late Dr. A. Bielschowsky.

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REFERENCES

1. Hughes, W. L.: Aniseikonia with no refractive error. Arch. Ophth., **17**:944 (May) 1937. Am. J. Ophth., **20**:887-890 (Sept.) 1937.

2. Ames, A., Jr.: The space-eikonometer test for aniseikonia. Am. J. Ophth., **28**:248-262 (Mar.) 1945.

3. Burian, Hermann M., and Ogle, Kenneth N.: Meridional aniseikonia at oblique axes. Arch. Ophth., **33**:293-309 (Apr.) 1945.

USE OF THE GONIOLENS FOR DIAGNOSIS OF RETAINED FOREIGN BODY IN THE ANTERIOR CHAMBER

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It has been said that a great number of errors encountered in the practice of medicine are the result of omission rather than commission on the part of the physician. Frequently, because of shortage of time or mental inertia, one fails to use all of the facilities readily available in an effort to learn more about an eye. The following case is not in itself unusual and has undoubtedly been encountered by numerous ophthalmologists before, yet it serves admirably to emphasize the need for more frequent use of gonioscopy.

CASE REPORT

Mr. X., a young man, came to my attention on July 28, 1947, because of a red, moderately painful, irritable right eye. He stated that a foreign body had entered the eye about 14 years before while he was working on a farm repairing machinery. At that time he struck the wheel of a tractor with a dirty hammer and at the same moment felt something strike his right eye. Several days later an X-ray film was taken and revealed a foreign body in the globe. A cataract had also developed in the interim. An unsuccessful attempt was made to remove the foreign body with a magnet. The patient was told that the foreign body was nonmagnetic and was located behind the opaque lens in the vitreous chamber. The eye became quiet in due time. On a subsequent occasion, X-ray films of his eye

were taken in another city and he was again told that there was a foreign body in the globe. Gonioscopy was not employed at any time.

Examination now revealed a normal left eye with 20/15 vision. The right eye showed a 10-degree divergence. It was moderately injected, principally in the pericorneal region, more pronounced in the lower half of the globe. The pupil was about 3 mm. in diameter and reacted sluggishly to light. The lens was cataractous and about half absorbed. The slitlamp revealed epithelial edema (bedewing) in the lower third of the cornea. A small corneal scar was also visible. There was a slight flare with a few cells but no keratic precipitates. The tension was: R.E., 6 mm. Hg (Schiøtz); L.E., 17 mm. An X-ray film demonstrated a faint opacity in the region occupied by the anterior segment. With a large-size Troncoso goniolens* in position, the angle was studied by means of a loupe and a small flashlight. A small, black, oblong foreign body was found lying in the angle at the 6-o'clock position in such a manner that the opaque sclera prevented its direct visualization.

After the acute inflammation was brought under control, the foreign body and the remainder of the opaque lens were removed. A subsequent X-ray study showed that the faint opacity previously noted in the anterior-segment area had disappeared. The foreign body was found to be a small piece of organic material, either wood or weed stem. The eye healed uneventfully and the inflammation promptly subsided. Eight weeks after the removal of the foreign body the vision was correctible to 20/25.

Discussion

This foreign body, which was entirely invisible, was easily and accurately located with the aid of gonioscopy. If it had been permitted to remain, the eye might ultimately have been lost. Sympathetic ophthalmitis, while extremely rare, was always a threat as long as the eye remained irritable because of a retained foreign body.

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* Troncoso, M. U.: A new model of contact glass for gonioscopy (goniolens). Am. J. Ophth., 28:1360 (Dec.) 1945.

CONGENITAL RETINAL FOLD WITH VITREOUS DISORGANIZATION*

A case report

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In 1928, the first case of congenital retinal fold was reported by Ida Mann in the *Transsactions of the Ophthalmological Society of the United Kingdom.* In 1936, six more cases were reported by her. In the same year, Weve reported eight cases of the same condition, which he called "Ablatio Falciformis Congenitalis." Other cases were reported by Ancona (1935), Kiewe (1936), Tillema (1937), Theodore and Ziporkes (1940), Van Manen (1941), and Gartner (1941).

This congenital defect is characterized by the presence of folds involving the inner layers of the optic cup (the retina without the pigment epithelium) which projects into the vitreous. From the cases reported, the general opththalmoscopic picture can be summarized by (1) the solid appearance of the fold, (2) branches of the retinal artery on the fold, (3) septumlike connections with the retina, (4) attachment anteriorly to the ora serrata, (5) strands passing to the lens near the equator, (6) clear vitreous and lens.

Case report

The case presented is that of a young girl, T. M., aged eight years, with a history of poor vision in the left eye discovered during a routine examination five months before be-

* Read at the meeting of the Eye Section, Philadelphia County Medical Society, April 2, 1947.

† Clinical Assistant, Wills Hospital, Clinic of Dr. Louis Lehrfeld.

ing seen by us in the clinic. Close questioning of a rather intelligent mother did not reveal any history of injury or inflammation involving her daughter's eyes.

History. The family medical history showed that the father had had a detached retina (spontaneous) with secondary glaucoma about 10 years ago, resulting in enucleation. Three other children in the family were all apparently normal. The child's past medical history told that she had had whooping cough at the age of three years, measles at four.

Examination. The adnexa were normal. E.O.M. appear to be normal. There was no evidence of nystagmus nor strabismus. The pupils were equal and reacted to light and accommodation. Vision was: O.D., 20/20; O.S., light perception (questionable).

The fundus examination showed the media of the right eye to be clear; the disc well defined and normal in color; the vessels normal. The lens of the left eye appeared to be clear; the vitreous was hazy with many fine dustlike opacities; the retina could not be visualized at this time. With a +12 lens, a large white area was seen between the 7- and 9-o'clock positions. At this time the large gray-white mass appeared to be extending anteriorly to the posterior part of the lens and near the ora serrata and posteriorly into the vitreous.

Under slitlamp examination, the cornea appeared to be normal; the anterior chamber was normal; X-ray studies of the orbit appeared normal, except for a small opacity near the posterior cortex at the center. The anterior vitreous showed fine opacities made up in the form of a reticulum. Strands were present which appeared to run from the mass horizontally and temporally near the posterior surface of the lens.

The mass transilluminated poorly; tension was normal; X-ray studies of the orbit showed no evidence of calcification.

Laboratory studies. The blood count was in normal range; Wassermann test was negative.

Course. Although no medication was prescribed, the patient was observed at frequent intervals. Within a period of about two months, although opacities were still present, the vitreous appeared to clear sufficiently so that a view of the retina was possible. An examination of the fundus with a +12 lens showed a large gray-white area between the 7- and 9-o'clock positions. The mass appeared to extend into the vitreous from the disc area and, anteriorly, to the posterior part of the lens and ora serrata. The area tapered off and appeared to fold into the retina. The temporal side of this mass presented a sharply demarcated surface seeming to fold under itself. Small minute blood vessels appear on its surface. Just posterior to the lens, strands could also be seen running horizontally from this mass, temporally. Inferiorly, when the eye was well dilated, a small grayish white mass could be seen near the ora serrata, which had, apparently, no connections with the larger mass.

Diagnosis. The differential diagnoses considered in this case were: A. Inflammatory causes—(1) cyclitic membrane, (2) retinitis proliferans, and (3) detached retina. B. Neoplastic causes—(1) retinoblastomata and (2) melanoma of the choroid. C. Congenital defects—(1) persistent tunica vasculosa lentis, (2) fibroblastic remains with Cloquet's canal, and (3) retinal fold.

The history, the ophthalmoscopic appearance, the clinical course, and the associated findings ruled out all the above etiologic factors except retinal fold.

Thus the solid appearance of the mass with the underfolding of the temporal surface, the extension from the disc to the ora serrata, strands passing near the lens, the exclusion of the other etiologic factors, and the lack of any specific history indicated that this was a congenital retinal fold. The partial disorganization of the vitreous may either be secondary or it may be entirely unrelated to this defect.

1713 Pine Street (3).

SOCIETY PROCEEDINGS

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

March 3, 1947

DR. BENJAMIN FRIEDMAN, *president*

OFFICE PROCEDURES IN BACTERIOLOGY

DR. FREDERICK H. THEODORE spoke on this subject during the instruction period.

BETA IRRADIATION IN OPHTHALMOLOGY

DR. CHARLES E. ILIFF spoke of the various uses of beta irradiation in ophthalmology and illustrated his talk with slides and motion pictures. He said that beta rays possess the same qualities as other rays in the power of selective tissue destruction, but in contrast to gamma rays their penetration is shallow. In no single case has any damage to the lens been observed either clinically or experimentally.

Dr. Iliff said that excellent results have been obtained in the treatment of vernal conjunctivitis. Recurrences are less frequent, and when these do occur, are less severe. In anterior ocular tuberculosis, beta therapy seems to shorten the course and decrease the severity of the symptoms with less residual scarring of the cornea. Irradiation, though, did not prevent future tuberculous recurrences. Dr. Iliff said that small benign tumors of the lid and anterior segment can be easily and safely removed with excellent cosmetic results. In corneal scars, where vascularization is a prominent feature and where there is still activity, irradiation appears beneficial. In old calcified and dense scars, treatment is not successful. Superficial vascularization after keratectomies and keratoplasties can be controlled with beta therapy. Encouraging results were also obtained in the treatment of acne rosacea keratitis. Dystrophies, sarcoid, lupus erythematosus, pemphigus, punctate keratitis, and corneal ulcers due to pyogenic infections, are not improved by beta rays, and may be made worse by their use.

UVEITIS WITH HYPOPYON AND RECURRENT GENITO-ORAL OPHTHOSIS (BEHCET'S SYNDROME)

DR. HELEN O. CURTH presented the case of a 27-year-old man, with left postoperative anophthalmos and almost complete loss of vision of the right eye. These findings are the end results of recurrent attacks of uveitis. Two years after the onset of the disease, the patient showed hypopyon. The patient also suffered from recurrent genital ulcerations and recurrent oral aphthae. This syndrome has been described by Behcet. Various kinds of local and systemic treatment proved futile. Dr. Curth said that patients with only two manifestations of the triad are considered abortive cases of the disease. A girl with recurrent genital and oral aphthae was also shown. These two patients did not show erythema nodosum, which is frequently seen in patients with Behcet's syndrome.

Dr. Curth, in discussing the differential diagnosis, mentioned other systemic diseases with manifestations in the eyes and on the skin and mucous membranes, such as Reiter's and Stevens-Johnson disease. Dr. Curth concluded that close collaboration of ophthalmologists and dermatologists may prove of great value in the investigation of these diseases.

Discussion. Dr. Charles A. Perera, described the left eye of the first patient. An iridectomy was performed in July, a cyclodiathermy in September, and enucleation in October. Microscopic studies of the globe showed a surgical coloboma of the iris

superiorly and necrosis of the inferior ciliary body resulting from the cyclodiathermy. The underlying pathologic processes included polymorphonuclear exudate in the lower anterior chamber, plasma-cell and lymphocytic foci in the iris and remaining uveal tract, posterior synechia, complicated cataract, complete detachment of the retina following contracture, subretinal hemorrhage, perivascular infiltration of the optic nerve, and phagocytic cells containing blood pigment on the inner surface of the retina and in the optic-nerve head. This eyeball, then, was the seat of a chronic recurrent uveitis and intraocular hemorrhages, followed by the development of a cataract and secondary glaucoma. Dr. Perera said that there was no clue to the etiology, which is believed to be a virus infection by some authors and an allergic reaction by others.

Sarcoid simulating Mikulicz's disease and Parinaud's syndrome

Dr. Isadore Givner presented two cases of sarcoid, one simulating Mikulicz's syndrome and the other simulating Parinaud's oculoglandular syndrome. The first case was that of a colored woman, aged 35 years, with generalized skin nodules a diffuse swelling of the parotid glands, and an enlargement of both lacrimal glands. Tuberculin tests up to 1:100 mg. O.T. were negative. Typical findings of sarcoid appeared in the lung and phalanges. Biopsy of a nodule showed masses of epithelioid and giant cells. No caseation and very little round-cell infiltration were present.

The second case was that of a 15-year-old white boy, who presented a round granulomatous growth on the under surface of the left upper lid of a week's duration. The left preauricular gland was enlarged. Mantoux test, 1:100,000, was positive. Biopsy of the granulation tissue disclosed naked tubercules, typical of sarcoid.

Dr. Givner emphasized the importance of biopsy in suspected cases. He felt that the findings of a positive tuberculin test are in keeping with the trend of considering sarcoid a special type of tuberculosis.

Discussion. Dr. Raymond E. Meek said that anyone who makes a diagnosis of Boeck's sarcoid is to be congratulated. It means keeping in mind this condition and also means careful observation and investigation to establish the diagnosis. Dr. Meek said that Dr. Givner deserves much credit for discovering these two cases and presenting them.

Recognition of sarcoid has a practical aspect in the treatment of uveitis. Many ophthalmologists feel that remote foci of infection are the most important causes of endogenous uveitis, while syphilis, tuberculosis, and other systemic diseases are recognized as causes, but are less important. The usual recognized causes of granulomatous uveitis are syphilis, tuberculosis, brucellosis, sarcoid, lymphogranuloma venereum, and certain fungus infections, according to Alan C. Woods, in his lecture on "The Influence of Hypersensitivity on Endogenous Uveal Disease." (Am. J. Ophth., **30**:257-274 (Mar.) 1947.)

Dr. Meek said that he felt that the problem of sarcoid may be of great importance in the treatment of uveitis. Once the problem of the etiology of sarcoid is solved, a new clue may be found for the prevention and treatment of this obstinate affection of the eyes. Woods said, "Nothing can be said of sarcoid, for the specific agent, whatever it may be, has never been isolated and the etiology of the disease is a complete mystery." Dr. Meek concluded by saying that we must continue our efforts in finding the cause of this disease.

Silent dacryocystitis

Dr. Frederick H. Theodore said that routine irrigation of the lacrimal passages in such a manner as to be able to examine the washings will frequently reveal the presence of an otherwise "silent" dacryo-

cystitis. This occurs in some cases with patent lacrimal passages and the complaint of persistent unilateral conjunctivitis. The examination of the washings is accomplished by having the patient sit with his head forward, so that the irrigating fluid comes out through the nose and is caught in the receptacle. The following observations are made: (1) the degree of patency, and (2) the character of the washings—whether shreds, pus, or mucus are present. Cultures and smears may be taken of this washing.

Dr. Theodore mentioned a number of cases of severe unilateral conjunctivitis which had persisted for months. The tear sac in each case had been declared normal because the irrigation had been done with the patient's head backward. By this method, the character of the washings cannot be observed. Treatment by frequent irrigation of the sac was followed by cure. Cultures of both the conjunctivitis and the mucus, revealed the same toxic organisms.

Dr. Theodore concluded that these observations suggest the existence of a subclinical, beginning mucous dacryocystitis, which may go on to frank dacryocystitis if untreated; therefore, the early diagnosis of this condition is of great value.

Bernard Kronenberg,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY

March 15, 1947

Dr. George Stine, *presiding*

Central choroiditis

Dr. Fritz Nelson presented a 26-year-old woman who suddenly, a few weeks previously, noticed a spot before her right eye after some domestic excitement. Central vision was measured at 5/100, and refraction revealed a −1.00D. of myopia. Funduscopy presented an area of edema around the macula extending to the disc. There was a crescentric, bright area above the fovea which might have represented either a folding of the retina or a subretinal hemorrhage. Under routine symptomatic treatment, vision improved to 5/15, although the fundus appearance remained the same. A Kahn test was normal, as were the blood count and a complete physical examination. No satisfactory diagnosis had been made.

Discussion. Dr. James Strong said that, although the history was of such short duration, it is most likely that the condition had existed a much longer time and had merely been brought to attention by the excitement. Dr. Leonard Swigert said he had noticed what he felt was pigment formation in the area, so that he deemed it to be a central choroiditis of not too recent origin. Dr. Nelson, in closing, said that the fact that the patient had suddenly noticed a scotoma seemed to indicate the condition to be acute since she would have noticed this before had it been present.

Microphthalmos

Dr. John C. Long presented a 2½-year-old girl with congenital, bilateral microphthalmos. Her prenatal, postnatal, and general history were entirely normal. No other member of the family had ever presented any ocular disease. Examination revealed severe microphthalmos with almost total opacification of both corneas. Vision consisted of light perception in the right eye only. The corneas measured 4.5 mm. in the right eye, and 3.5 mm. in the left. Ocular movement seemed normal and the child seemed physically and mentally normal in all other respects. The mother was of the opinion that both eyes had become larger during the past year.

Plastic and reconstructive surgery of the eyelids

Dr. George A. Filmer presented a com-

prehensive paper on this subject generously illustrated with kodachrome slides of patients in the Eye Department of the U. S. Army Beaumont General Hospital which served as a reconstructive eye center. The most frequent repair job called for was the repair of skin cicatrices. These could often be done by the simple "Z" plasty along the line of the scar. When this failed, a full-thickness skin graft was employed. These grafts were taken from the other eyelid, the retroauricular fold (which source proved exceedingly satisfactory) or the supraclavicular region. A proper pressure dressing must always be applied to these.

In revision of the lower lid at the inner canthus, a pedicle of "Z" flap around the canthus was most used. This often extended from the side of the nose well down over the upper portion of the cheek. If this failed or was not feasible, a skin graft was employed. At the outer canthus, the "Z" flap was also employed whenever possible. An external canthal tarsorrhaphy or the Kuhnt-Szymanowsky repair techniques were used. If too much damage had been done, a fascialata transplant was used as a sling around the whole lower lid.

Revisions of upper lids were accomplished by the routine methods of notch repair, by "Z" flaps, or by skin grafts. Eyebrow grafts were taken from the temple or the retroauricular fold. Eyelash grafts were best taken by vertical sections through the eyebrow. For controlling the slant and appearance of these lashes, the ordinary cosmetic eyelash curlers were recommended. For reconstruction of either lid, the regular Hughes reconstruction technique was employed. If this failed, then sliding flaps, pedicle flaps, and whole-thickness skin grafts were used.

Morris Kaplan,
Secretary.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

March 19, 1947

Dr. Howard F. Hill, *presiding*

Ocular proptosis

This subject was discussed by Dr. Derrick Vail of Chicago in the paper of the evening. The classification of the types of proptosis, correlated with the etiology, signs, and symptoms, and the profuse number of illustrative slides made a very instructive and interesting paper.

Dr. Vail classified ocular proptosis into two main subdivisions: (1) apparent proptosis, and (2) true proptosis. In apparent proptosis, the protrusion of the lids without edema may be a result of fat, familial feature, or asymmetry of face; while protrusion of the lids with edema may be due to ocular causes such as iritis and glaucoma, or due to an inflamed lid caused by chalazion, hordeolum, abscess, lacrimal abscess, frontal sinusitis, periadenitis, trauma, insect stings, trichinosis, and so forth.

In true proptosis, the protrusion may be rapid with edema of the lids, as seen in glaucoma, iridocyclitis, panophthalmitis, cellulitis of the orbit, serous or purulent tenonitis, caverous sinus thrombosis, hemorrhages due to trauma or spontaneous hemorrhage associated with scurvy, anemia, rickets, hemophilia, and so forth. Gradual proptosis without edema may be congenital due to malformation of orbit, an encephalocele, and so forth; it may be due to ocular enlargements as seen in high myopia, buphthalmos, melanoma of choroid perforating posteriorly; or it may be associated with third-nerve paralysis with loss of muscle tone, or after a tenotomy. Unilateral proptosis with lateral displacement may be due to a mucocele or neoplasm from the sinus, exostosis of the orbit wall, meningioma, periostitis of orbital wall, complication of nasal surgery, em-

physema of the orbit, and so forth. Unilateral proptosis with central displacement may be observed in Graves's disease, in paradoxial exophthalmos, in vascular conditions such as arteriovenous aneurysm, varicose orbital veins, cirsoid aneurysm of orbit, or nevi, in association with tumors of the optic nerve. Unilateral proptosis with central displacement is also due to cysts of the orbit, either congenital such as encephalocele, congenital coloboma of choroid and dermoid, or acquired cysts such as the exudative type, traumatic epithelial inclusion, or parasitic. It is observed also with neoplasms either of benign type, such as plexiform neuroma, or of malignant type, primary or secondary.

Binocular exophthalmos may be due to familial congenital malformation, tower skull, Graves's disease, paradoxial or ophthalmoplegic exophthalmos, sarcoma of ethmoid, bilateral sinusitis, neurofibromas, myasthenia gravis, cavernous sinus thrombosis, Mikulicz disease, cranio-orbitofacial malformations such as hereditary craniofacial dysostosis (Crouzon's disease), multiple xanthomatosis (Schuller-Christian disease), and so forth.

Discussion. In the discussion that followed, Dr. Frederick Verhoeff spoke of the difficulties in making a diagnosis in cases of proptosis. He described a case of meningioma in a girl, aged five years, which went around the optic nerve but did not invade the papilla. He said that at the time there was considerable discussion as to whether the lesion was primary in the orbit or not. He felt that if it does occur, it must be very uncommon and that it was wise, in individual cases, to believe that it was not primary. He also mentioned that he has noted errors in making a diagnosis of neurofibroma of the optic nerve when glioma is present and has heard of some cases of glioma associated with neurofibromatosis elsewhere.

Dr. Edwin B. Dunphy added another type of proptosis to those mentioned by Dr. Vail, namely intermittent exophthalmos, usually occurring in an adult when he holds his breath, bends over, or during some athletic event. One eye will come forward as much as 5 to 8 mm. and then recede into the orbit. He had seen several cases, one supposedly due to varices in the orbit which filled up. He tried injecting urethane solution without success in this case.

Dr. H. Frederick Stephens asked about the effect of the meningiomas on the optic foramen and their surgical approach.

Dr. Vail (in closing) said that diagnosis will tax one's ingenuity to the utmost, requiring a most careful history, X-ray examination, including the optic foramina and sinuses as well as the orbit, and examination of the appearance of the orbit, including listening with the stethoscope. He agreed with Dr. Verhoeff that probably gliomas of the optic nerve have been mistakenly called neurofibromas. He mentioned a case of a 10-year-old child who had right ocular proptosis with slight limitation of movement with the characteristic pigment changes of neurofibromatosis in the skin. The child's grandmother had the same skin changes plus typical neurofibromatosis nodules on the entire body. He also has seen the intermittent exophthalmos described by Dr. Dunphy, and said that he believed most hemangiomas of the orbit also show the same type of exophthalmos eventually. He described a case with this type of hemangioma in which the exophthalmos with recurrent subconjunctival and subcutaneous hemorrhages disappeared entirely after insertion of radon into the orbit. In regard to the effect of a meningioma on the optic foramen, he said that he believed that study of the literature, as well as experience, would bear out the impression that one does not get an enlarged optic foramen in the presence of proptosis suggestive of an intraorbital tumor without having intracranial involvement. Therefore he agreed with Dr. Dandy that the real approach is always through the intracranial route and never through the orbital route. Serious

complications may occur using the orbital route, and the frontal approach is hazardous for some time after the orbital approach has been used unsuccessfully.

Mahlon T. Easton,
Reporter.

SOCIEDAD OFTALMOLOGICA DE MADRID

March 21, 1947

The Millard-Gubler syndrome

Dr. Casero presented this subject with reference to a patient who showed the syndrome in an anomalous manner.

Discussion. Dr. Marin Amat said that the symptoms presented in Dr. Casero's case—right hemiplegia, with paralysis of the left external rectus muscle and paresis of the right inferior facial—do not fall within the classical mold of the Millard-Gubler syndrome (alternate inferior paralysis) in that the hemiplegia is on one side and the paralysis of the external rectus (sixth cranial) and of the facial (seventh cranial) on the opposite side, with a lesion in the protuberance of the pyramidal tract before decussation (central neurone) and of the roots of the sixth and seventh cranial nerves beyond their origin in their respective nuclei (peripheral neurones).

In his opinion, this clinical incongruity might be explained by a poor interpretation of the neurologic examination and failure to differentiate between the deviation of the mouth to the right and a right facial paresis (antagonistic symptoms), or perhaps, failure to locate a lesion in the cerebral peduncle and in the protuberance.

The most acceptable explanation is that this is a case of one of those rare crossed (alternate) paralyses limited to the sphere of innervation of the cranial nerves.

Dr. Carreras said that it is evident that the case presented by Dr. Casero is one of a protuberance syndrome, but that it is not a pure example of the syndrome of Millard-Gubler. The lesion is, naturally, in part in the inferior protuberance, since only this localization can explain the simultaneous involvement of the fibers of the pyramidal fasciculus and the root fibers of the sixth pair of the same side. However, in order to explain the syndrome shown by the patient one must surmise that the same lesion extends sufficiently upward to involve the aberrant fibers of the pyramidal bundle which go to the facial nucleus of the opposite side. Thus can be explained the fact that the facial paresis is contralateral instead of ipsolateral, as in the typical Millard-Gubler syndrome. It is also necessary to assume that the lesion extends only to a slight depth in the body of the pons; otherwise, it would involve nerve structures which would greatly increase the symptomatology of the case.

Let us hope that the operation which the patient is soon to undergo will clear up the doubts which we still have with reference to the nature of the lesion. I believe it is a tumor, perhaps a glioma. The papillary edema, which was not present at first, supports the belief in a tumor.

Retinal detachment with cystic formation

Dr. Casero presented the case of a 16-year-old boy, emmetropic, who showed cystic formation in the retinas of both eyes with bilateral detachment. There was a history that two months before the detachment the patient was hit on the forehead. For this reason the author described the lesion as traumatic, since it was possible that the blow was a contributing factor in loosening the retina and causing a detachment. But undoubtedly there had been previously a degenerative cystic process in both retinas.

Joseph I. Pascal,
Translator.

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FUNDAMENTAL RESEARCH IN OPHTHALMOLOGY

In an article in the April 11, 1947, issue of *Science,* entitled "Fundamental Research in the Clinical Specialties," V. Everett Kinsey, biochemist at the Howe Laboratory of Ophthalmology of Harvard University, analyzes with exceptional acumen the problems connected with basic research in ophthalmology. A discussion of this aspect of ophthalmology seems particularly timely in view of the recent establishment of two new foundations for basic research in ophthalmology on the Pacific Coast.

Kinsey made a survey of the status of fundamental research in the clinical specialties at some of the larger universities and found the situation to be in general unsatisfactory. Research programs were found to be handicapped by inadequate funds and by the fact that neither the well-qualified department heads nor the unpaid clinical staff members were in a position to devote sufficient time to them. The current practice of assigning faculty members from basic-science departments to clinical departments,

and vice versa, with salaries and duties divided, was found to be more often unsatisfactory than satisfactory. Kinsey calls attention to the fact that the number of investigators working in any given field is frequently pitifully small. Glaucoma, for example, is one of the principal causes of blindness in individuals past middle age and yet in the United States at the present time not more than three investigators are devoting half or more of their time to it. He concludes that as a result of these half-way measures the amount of fundamental research in the clinical fields is extremely small and that even if sufficient funds were to be made immediately available few departments would have either the personnel or the programs ready to take advantage of them.

Kinsey then considers the various possibilities for expanding research in the clinical fields. He discusses the advantages and disadvantages of special laboratories for the study of specific diseases, and of special research institutes in which researches relating to a number of specialties could be performed. He concludes, however, that the soundest plan is to establish laboratories in connection with specific clinical departments in the medical school and to staff them with well-trained full-time workers. The principal function of each of these laboratories should be to develop the fundamental aspects of the clinical specialty concerned and to make them available to the postgraduate student. Kinsey states that the experience of the Howe Laboratory indicates that this type of research unit is effective. He feels that although fundamental discoveries have in the past been made by isolated workers devoting their leisure time to research, there is every reason to believe that the coöperative effort of individuals with different backgrounds and training inevitably yields the best results. He believes that research of this kind is essentially a full-time job if facilities and personnel are to be utilized efficiently and if the quality of the work is to compare favorably with that in other branches of science.

In Kinsey's opinion the first step in establishing a research laboratory is to obtain the services of an able director. He believes that in general the head of the clinical department should not also be the director of the laboratory since he hasn't the time for what should be a full-time job in itself. The clinical department head, moreover, is likely to be interested preëminently in the practice of medicine and to lack the scientific background which would qualify him to direct research. He concludes that both positions are of such importance that a parallel administrative organization such as obtains at the Howe Laboratory is to be preferred to a vertical administrative organization.

An important secondary function of the research laboratory should be the postgraduate teaching of the basic sciences as applied to the medical specialty concerned. Kinsey believes, however, that in no case should this teaching function be allowed to occupy over a quarter of the staff's time. He discusses in detail the question of the academic standing, remuneration, and tenure of the laboratory staff and expresses the opinion that the system of rank should be comparable to that of career men in other academic fields rather than to that of the clinical department. In the latter, outstanding physicians, devoting only a small fraction of their time to the medical school, may hold relatively low rank. In order to avoid the appearance of discrimination, the titles of the laboratory staff should be different from those of the clinical staff, for example, "professor of ophthalmological research" rather than "professor of ophthalmology." If capable men are to be obtained and retained, salaries must compare favorably with those in basic-science departments and industrial-research laboratories and reasonable tenure must be assured.

The objection may be made that if the basic scientist devotes the time and effort necessary to familiarize himself with both the medical and laboratory aspects of a

specialty, he may not be able to maintain the same proficiency in his basic field as the more specialized worker. Kinsey refers to the saying that such a man may be neither fish nor fowl but answers the objection by pointing to the example of the biochemist who is both biologist and chemist. He believes that this "hybrid" has contributed more to the knowledge of biochemistry than either the biologist or the chemist and suggests that in the future the great contributions to the advancement of knowledge in scientific medicine may well come from another hybrid who might be called the "medical scientist."

This article of Kinsey's comes at a time when the importance of the basic sciences in relation to ophthalmology is becoming more and more widely recognized. In this connection the role of the American Board of Ophthalmology in stimulating basic-science teaching and, indirectly, basic research should not be overlooked. Nevertheless, the position of the full-time investigator in ophthalmology is frequently not an entirely happy one. Workers devoting virtually their entire time to ophthalmologic problems have complained of relative isolation and of the fact that their specialization has precluded, or at least handicapped, the possibility of their returning to the basic-science departments. They have found, moreover, that their chances of advancement are poorer than they would be in comparable positions in the basic-science departments; in the latter there is of course always the possibility of becoming a department head.

As ophthalmologic research laboratories increase in number the factor of isolation will be reduced and it is to be hoped that the new laboratories will be organized in such a way as to provide adequate rank and remuneration. Kinsey's suggestion that the research laboratory be separated administratively from the clinical department has much in its favor, and the Howe Laboratory testifies to the effectiveness of this method. On the other hand there are several institutions, notably the University of Pennsylvania and Johns Hopkins University, in which the vertical type of administration has functioned exceedingly well. This is clearly due to the fact that the department heads in these institutions have been outstanding basic investigators as well as clinicians. Unfortunately this happy combination must be considered most unusual. Whatever the administrative set-up, however, there is no doubt but that in the future our specialty will be advanced in direct proportion to the output of the "medical scientist," working either alone or in coöperation with the clinical ophthalmologist.

Phillips Thygeson.

CRITICISM OF THE AMERICAN BOARD OF OPHTHALMOLOGY

Some workers in the field of education for the practice of ophthalmology may have felt concern as to certain parts of the address delivered by President Alan C. Woods at the annual meeting of the American Academy of Ophthalmology and Otolaryngology in October, 1947. Yet frank and understanding criticism in any field of human activity is desirable, and often serves the very admirable purpose of leading to improvement in method. On the other hand it is always proper to inquire whether the criticism is well founded; in other words one function of the critical faculty is to criticize the critic.

The American Board of Ophthalmology, founded 30 years or so ago, represented the carefully studied conclusions of as fine a group of stalwarts as the field of medical education has ever known. It would have been strangely superhuman if that group's judgments and procedures had been entirely free from error or doubt or beyond improvement. It must also be recognized that no large and greatly varied mass of conditions is ever uniformly well met by any set of regulations. But the quality that perplexes us in President Woods's address is that it seems at times to present criticisms which,

if taken too seriously, might endanger the whole fabric of the Board's endeavors.

What have been the main purposes of the American Board of Ophthalmology?

It has been repeatedly emphasized that no such Board could demand or achieve uniform perfection in the would-be specialist's scientific knowledge of his subject; but that the Board's desire should be to determine whether the specialist possessed such proficiency as to render him a safe practitioner of ocular diagnosis, therapeutics, and surgery. It is obvious that in the minds of different examiners there may exist appreciable variation as to what constitutes such proficiency, and it cannot be doubted that such variation has worked at times to the advantage or prejudice of individual candidates. But in a general way such broad conception of the Board's requirements has fitted the needs of the public as to the practice of ophthalmology.

The Board had to realize the existence not only of varying intelligence and training among its candidates, but the basic fact that teaching institutions throughout the country were not of uniform efficiency, but emphasized in unequal degree the significance of different phases of the subject of ophthalmology, now this, now that, according to the strength or weakness of individuals or teachers or equipment. Certain outstanding educational groups have shown a tendency to prepare students to assume the capacity of teachers rather than of private practitioners, and have therefore required exceptionally lengthy periods of internship or residency. But to make this system widespread might have a dangerous tendency to defeat the general educational purpose, by encouraging the existence of great numbers of uncertified, and therefore of poorly rather than well-trained specialists.

Woods objects, as others have objected, to the Board's requirement of a minimum of one year of internship in a general hospital. This problem has given rise to much debate. But, taking into account the still inevitable inequalities of method and efficiency in general and technical education, and the variations in human personality, the rule is probably much more frequently wise than foolish. Woods objects that the system wastes precious time. What system of training in a clinical institution does not waste precious time? How large a proportion of the activities of a student nurse is free from this accusation? How much of the time of an intern or resident in the great institution over which Woods presides at Baltimore is completely exempt from such a criticism? The important question with regard to the preliminary or general hospital internship is whether it makes the practitioner of ophthalmology better able to understand the relation of ophthalmology to general medicine, and not only the technical but the human problems of the patients' lives; and again it must be remembered that the American Board exists primarily not to create research and laboratory workers but to satisfy the clinical needs of the general community.

The presidential address further takes exception to the tendency to make the certificate of the examining board a condition for appointment or promotion in general or hospital staffs. This condemnation is even extended to include the action of the United States Veterans' Administration in requiring that persons appointed to its attending or consulting staffs be diplomates of the Boards representing their specialties, and also in granting a 25-percent increase in salary to members of its full-time staff who obtain certification.

But we cannot escape the truth that human nature very generally needs incentives for the performance of desirable acts. At the inception of the American Board for Ophthalmic Examinations (the original name of the present Board of Ophthalmology) this fact was recognized through adoption by the American Ophthalmological Society of the rule that future candidates for its membership must have received the Board's certificate; and by the American Academy of

Ophthalmology and Otolaryngology of the rule that candidates for membership must possess the certificate either of the Ophthalmologic or the Otolaryngologic Board. It is also true that these requirements have been a great stimulus to the success of the activities of those Boards. Are we now to dispense with this kind of incentive?

It is curious that, in considering weaknesses associated with the working of the examining boards, the Woods presidential address does not call even passing attention to the fact that the certificate of membership in the American Academy of Ophthalmology and Otolaryngology fails to indicate upon which Board certificate the approval for membership in the Academy is based. Yet the certificate of membership in the Academy is displayed in thousands of offices all over the country as one of the criteria of efficient training, and the certificate of the Board of Otolaryngology, usually rated as rather easier of attainment, will undoubtedly be sought by many Army and Navy veterans in preference to the certificate of the Board of Ophthalmology, whose greater emphasis upon basic and theoretic knowledge has aroused more fear and trembling among candidates.

There is at least the merit of frankness in the reminder that some 12 years ago the Medical Board of the Johns Hopkins Hospital adopted a resolution to the effect that the Board was opposed "to the principle that certification by any of the specialty boards should be a condition of appointment or promotion to any position on the staff of the Johns Hopkins Hospital"; and that the secretary of that Board was requested to notify such other hospitals as he deemed proper of the action of the Board in this instance. This was a rather unpleasant slap at standardization! As regards the principle involved, we are assured (in the presidential address) that the American Board of Ophthalmology does not appear to have recanted in any way, and the writer says: "To this activity of the specialty boards Dr. Chesney has applied the adjective 'pernicious.' In this I fully agree with him."

Yet surely in this country, with its peculiar balance between Federal and State constitutional rights, some such measures aimed at professional standardization are not only permissible but desirable; and the principle of advantage pertaining to the certificates of the specialty boards is a valuable step in the direction of such standardization. Is it not possible to retain the advantages of this principle and practice, without serious disadvantages? Would the writer favor some elaborate system of control through the Federal Government, under a general scheme of socialization?

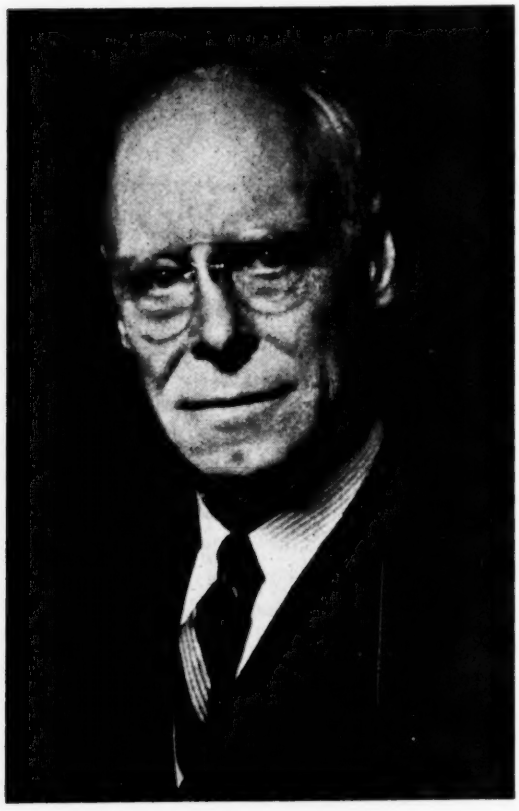
Woods's fear that research institutions may suffer from the application of any such general principle or rule is surely exaggerated, because the good sense of the examining boards is bound sooner or later to recognize any such special exemptions as may prove necessary in the case of research workers. Equally exaggerated, it may well be argued, is the further pronouncement that the present policies of the national societies lie "squarely across" the pathway along which ophthalmology must henceforth develop. And surely it can be said that, subject to recognized standards of excellence, "the national societies" already comply with Woods's desideratum that they "open their ranks, without distinction or the creation of different classes, to all medical men or scientists whose primary interest lies in the field of ophthalmology." But it is hardly to be denied that a scientist cannot be regarded as an ophthalmologist unless he has a basic and adequate understanding of the clinical problems of ophthalmology, such as is demanded by the American Board.

W. H. Crisp.

OBITUARY

DR. LOUIS STORROW GREENE (1872-1947)

On November 12, 1947, during his sleep, Dr. Louis Storrow Greene was called to his reward which he richly deserved. He had been at work most of the day in his office and after dinner had conducted a meeting of the vestry of his church until after midnight.



LOUIS STORROW GREENE

He had a heart block, and was completely unconscious of the approach of the end of his life when he retired.

Dr. Greene, while of Virginia ancestry, was born in Columbus, Georgia, November 19, 1872. He was the youngest son of Anne Appleton Storrow and William Spencer Greene. His father, at that time, was a construction engineer of railroads: hence his early education was in the deep south, Alabama, and later in Virginia. His premedical work was at the University of Virginia from which he was graduated in medicine in 1895. He spent the next two years in New York doing postgraduate work at Charity Hospital and the New York Eye and Ear Infirmary.

In 1897, he came to Washington and associated himself with Dr. William H. Wilmer with whom he remained in the practice of ophthalmology until 1915. During these years, he taught diseases of the eye at Georgetown University Medical School. He served as ophthalmologist to the National Medical Advisory Draft Board during World War I; and was ophthalmologist to the Episcopal Hospital Aviation Unit.

He was associated in various capacities on the staff of the Episcopal Eye and Ear Hospital, being the last of the staff that began service in the present hospital. He was a senior surgeon at the time of his death.

Dr. Greene was a member of the American Medical Association, District Medical Society, Washington Ophthalmological Society, French Society of Ophthalmology, and of the American Ophthalmological Society, of which he was president in 1936.

Dr. Greene was a sound ophthalmologist, well rounded in the practice of his art. He was a very skillful surgeon and a keen diagnostician. His advice was often sought by younger colleagues as a consultant. His great joy was in selecting younger men and helping them start their medical careers: many of them owe their more rapid advance in their practice to his support and encouragement.

He was a loyal friend and a delightful companion. His vacations were often spent in hunting and fishing trips, on many of which I accompanied him. He had a keen sense of humor, was adept in the verbal passage of arms, in which he usually bested his adversary although he never left a sting behind.

His religious life was full, for he was a strong lay worker in his chosen church, the

Protestant Episcopal. He was senior warden at the time of his death.

He was married in 1903 to Miss Louise Packwood Burke who survives him together with two children, a son and a daughter. John W. Burke.

CORRESPONDENCE

An ocular test for penicillin susceptibility (dermatitis venenata)

Editor,
American Journal of Ophthalmology:

It has been my observation that, as the years roll by, people in the United States are getting more and more allergic. In this short report I do not wish to discuss allergy and its many vague and not yet understood ramifications, but briefly to call attention to one of our most modern drugs and to suggest an ocular test which may be of benefit.

I wish also to warn against the promiscuous use of this relatively new drug which is a most valuable adjunct to our pharmacopeia and which, as we all know, has proved its worth when used with reason and some caution.

When any new drug is discovered and is found worthy in certain pathologic conditions, we are sometimes fooled into the belief that we have a panacea for all the ills to which the flesh is heir. The medicine I wish to discuss briefly is penicillin. From the literature I am receiving, I find that penicillin is being used for almost every known ailment from treatment of the vagina with vaginal suppositories to treatment of the eyes with ophthalmic ointment.

In my own practice I have known and seen three cases whose reactions were far from those desired. Two cases for which the drug was given were of indefinite corneal infiltrations whose etiology could not be positively established, and one was a case of lid infiltration which later developed a Vincent's angina. The patients were all given "big shots" of penicillin. Two of the patients developed urticarial and vesicular eruptions while the other acquired a general diffuse desquamation which took some time to cure. One of the patients died.

I know that some cases are emergency ones and, when it is a matter of life or death, minutes count. There is no time to test the patient's reactions. But in those cases where time is not so valuable, and the intradermal or small dose injections have been tried, I wish to offer the following simple ocular test as an added precautionary measure and a safe way to determine the susceptibility of the patient to the drug.

The test is as follows. One eye is selected; the other used as a control. Penicillin ophthalmic ointment (calcium) is instilled in the lower cul-de-sac of the eye three times a day; the excess of the ointment is wiped off with sterile cleansing tissues. The eye should not be washed either before or at any time after the instillation of the penicillin. A positive reaction is manifested on the 4th or 5th day by a thickening of the lids, with a brawny desquamation and intense itching. If the finger is gently passed over the skin of the lids there is a sensation as if the finger were passed over very fine sandpaper. The upper lid is usually more intensely affected than the lower lid. Strangely enough the conjunctiva and cornea are unaffected, the reaction being confined exclusively to the skin of the lids.

This test, I believe, will assist materially in diagnosing the susceptibility of individuals to penicillin. Since sensitivity to penicillin is usually manifested by skin lesions, it is my opinion that this test would be a very good indication of general sensitivity. In those cases which showed skin-lid reactions, the conjunctiva and cornea were positively *not* affected.

(Signed) William Brown Doherty,
New York, New York.

BOOK REVIEWS

THE OCULOROTARY MUSCLES. By Richard Gordon Scobee, M.D. St. Louis, C. V. Mosby Co., 1947. 359 pages, clothbound, illustrated. Price, $8.00.

This is the first textbook on the extraocular muscles in the past 11 years and one of the most effective that has been written on the subject. A difficult and controversial division of ophthalmology is logically and clearly handled and, perhaps equally important, the book is interesting and readable. The underlying philosophy owes much to the work of the late F. Bernard Chavasse, a writer on the subject who has not received the attention that he has deserved.

Scobee's monograph begins with anatomic and physiologic studies. Photographs of an ophthalmotrope are utilized to indicate the attachments and functions of the oculorotary muscles. Diagrams aid materially in the interpretation. The concepts of muscle action are so well given as to relieve the obscurity engendered by the tables of straight and tilted blocks depicted in most texts. The 2nd to the 6th chapters deal with additional fundamentals of ocular deviations, such as the underlying neuromuscular mechanisms and elementary laws governing the action of the oculorotary muscles. Section II covers the latent deviations, the etiology, as well as prescriptions, and is separate from the rest of the book. Section III contains a discussion of the manifest deviations, and Sections IV and V deal with the diagnosis and treatment of the deviation. One of the best chapters is that on the "Analysis of the Case" wherein is described the routine employed by the writer.

Almost every ophthalmologist is interested in the surgical treatment of squint because, in many cases, surgery is necessary for a cure whether or not orthoptics or spectacles, or both, have been employed, and furthermore most ophthalmologists are interested in surgery. The chapter on the surgical principles indicates that the author believes in the theory followed in orthopedic practice of weakening the antagonistic muscles in cases of underactivity of a muscle rather than direct attack on the affected muscles. He does not advocate any specific surgical technique, being satisfied with the enunciation of the general principles of corrective surgery. He points out convincingly the importance of proper handling of the check ligaments after having previously clarified their anatomy. A careful study of the book is the best argument for a complete analysis of each muscle case including the findings on the operating table when surgery is indicated. From a perusal of the earlier chapter one can analyze the muscle or muscles at fault in a given case and treat the patient intelligently and individualistically. The findings under anesthesia must be used as the final criterion as to the surgery to be undertaken.

This splendid monograph will help ophthalmologists to an understanding of the modern concepts about the extraocular muscles and may lead them to abandon the indiscriminate recess-resect operations which have tended to be the only procedures employed by many ophthalmic surgeons.

The book is compact and well printed on good paper, with many excellent cuts and photographs that illustrate the text effectively and aid in the interpretation of otherwise difficult ideas. This is an outstanding contribution to ophthalmic literature.

Lawrence T. Post.

HEADACHE. By Louis G. Moench, M.D. Chicago, The Year Book Publishers, 1947. 207 pages, 55 illustrations. Price $3.50.

The author divides the subject into chapters dealing with pathologic anatomy and physiology of headache; headaches from intracranial pathology, spinal puncture and ventriculography; cranial nerve neuralgias; headache of ocular origin; headache of nasal origin; headache from pathology in the neck; headache from systemic disorders;

histamine headaches; migraine and headaches of emotional origin.

The first chapter opens with the statement that "no understanding of headache is possible without a comprehension of the pain-sensitive structures of the head and the disturbances which bring about their stimulation." Illustrated by excellent line drawings the various sensitive structures are discussed and the regions to which the pain is referred outlined. Of particular interest to the ophthalmologist is the frequency with which pain from stretching or irritating arteries is referred to, or behind, the eye. For example, the intracranial segment of the internal carotid artery, when stimulated, refers pain behind the eye and low in the temporal region. The middle cerebral artery and the sensitive proximal portion of the anterior cerebral artery refer the pain in and behind the eyes.

The chapter on ocular headaches consists of 11 pages in which the various ocular headaches are discussed briefly. For the small space devoted to this subject it would seem that too much emphasis has been placed on aniseikonia.

The book presents an excellent exposition on the underlying mechanism of headache together with a discussion of the areas to which the pain is referred.

The makeup of the book, the paper and the binding are all good.

Frederick C. Cordes.

CENTRAL AND INDIRECT VISION OF THE LIGHT-ADAPTED EYE. By Viggo Clemmesen. Acta Physiologica Scandinavica, **9**:1-206 (Supplement 27), 1947.

This monograph with an extensive bibliography is written in English and has a summary in Danish. It is a report of the author's extremely thorough and capable investigation of indirect vision which he carried out because knowledge of the subject seemed rather deficient.

The first chapter is devoted to an analysis of the visual sense on the basis of the literature and for this purpose the subject is divided into light sense and physiologic resolving power. The first factor is measured by the discrimination factor and the second is not dealt with, in order to keep the investigation within manageable bounds. Under the heading, physiologic resolving power, an account is given of the possibilities of exact localization of image point in the monocular field, as well as the importance of optical factors, especially the resolving power of the optical system of the eye and the anatomic structure of the fovea. A functional unit is defined as the number of cones which are connected to the same optic ganglion cell through a conducting neurone. At the fovea the functional unit must consist of at least one cone. In the second chapter indirect vision is considered under the same headings.

In the second part the author describes his own investigations which consist of comparative sense-physiologic experiments on central and indirect vision. Experiments on the following functions are recorded: the minimum separable, perception of movement, form sense, aligning power, and discrimination of thickness of line.

The discrimination of thickness of line must be interpreted as a function of the intensity discrimination (light sense) when the object exceeds a certain minimum size. The minimum separable for objects illuminated from before may also serve as a measure of light sense.

Physiologic resolving power is measured by the minimum separable for luminous squares of threshold brightness on an unilluminated ground, or by the minimum separable for an unilluminated square on a luminous ground of threshold brightness. Perception of movement of a luminous point on an unilluminated ground can be used as a measure of physiologic resolving power and so can the form sense under certain conditions and with certain reservations.

The aligning power is of a complex nature. It is a function of physiologic resolving power and of the intensity of discrimination.

The physiologic resolving power yields information on the retinal structure and is, therefore, of the greatest interest for comparisons of central and indirect vision. Indirect vision begins to act at a distance of 2.7 inches from the center of the visual field; even at this small eccentricity the minimum separable is larger than at the center. The physiologic resolving power decreases rapidly with eccentricity irrespective of the structural limits in the retina (rod-free area). The size of the functional unit increases with eccentricity up to three degrees in the horizontal meridian and two in the vertical. Outside these eccentricities the units are no longer functionally separated, and it must be assumed that the nerve impulse spreads through horizontal neural connections. The variation in size of the functional unit within the fovea is caused by variations in the diameter of the cones and outside this area not only by the variations of the distances between the cones but also by the number of cones connected with each nerve fiber.

This necessarily brief glance into this very interesting monograph cannot hope to do more than suggest the pleasure that any reader who is interested in physiologic optics will derive from studying the original.

F. H. Haessler.

HANDBOOK OF OPHTHALMOLOGY. By Ignacy Abramovicz. Warsaw, Poland, Scientific Publications of the Medical Institute, 1947. 580 pages. Price, not listed.

Abramovicz, formerly professor of ophthalmology at the Medical School of Vilno, is at present director of the ophthalmological department of the Medical Academy at Danzig. This handbook evinces a mastery in condensing the entire domain of ophthalmology into a brief survey for the medical student and in selecting for more significant description those areas of ophthalmology, orientation in which is of greatest value to the general practitioner.

It is essentially a practical treatise, compiling massive data based on factual foundations and making no pretense to include the newer data or even to point out the directions of research. The chapters on trachoma, and ocular injuries are quite comprehensive. For the rest, the book follows the traditional pattern of devoting the first chapters to the anatomy, physiology, and embryology of the eye, with a special chapter on this domain in the newborn and infants. Refraction and motor anomalies are covered in some detail, and ocular surgery is completely left out.

The chapters devoted to ocular diseases present accurate, balanced, dependable descriptions, made more persuasive by profuse and excellent illustrations. The book contains 256 illustrations, some of which are reproductions from the literature, and 14 plates of fundus photographs in color; the illustrations are particularly numerous in the chapters on diseases of the orbit, lids, lacrimal apparatus, and the cornea. The printing is unusually good for publications received from this part of Europe. It was done in Sweden, as a contribution of the Swedish government to the cultural progress of Poland. While there is nothing new in this handbook, it undoubtedly represents a significant contribution to the ophthalmologic needs of Poland, for to our knowledge there was no handbook of a similar nature in the Polish language.

Ray K. Daily and Sylvan Brandon.

ABSTRACT DEPARTMENT

EDITED BY DR. F. HERBERT HAESSLER

Abstracts are classified under the divisions listed below. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. Anatomy, embryology, and comparative ophthalmology
2. General pathology, bacteriology, immunology
3. Vegetative physiology, biochemistry, pharmacology, toxicology
4. Physiologic optics, refraction, color vision
5. Diagnosis and therapy
6. Ocular motility
7. Conjuctiva, cornea, sclera
8. Uvea, sympathetic disease, aqueous
9. Glaucoma and ocular tension
10. Crystalline lens
11. Retina and vitreous
12. Optic nerve and chiasm
13. Neuro-ophthalmology
14. Eyeball, orbit, sinuses
15. Eyelids, lacrimal apparatus
16. Tumors
17. Injuries
18. Systemic disease and parasites
19. Congenital deformities, heredity
20. Hygiene, sociology, education, and history

1

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Gát L. **Topographic study of the insertions of the rectus muscles.** Ophthalmologica **114**:43-51, July, 1947.

Post mortem measurements of the width in equatorial direction and the distance from the corneal margin of the insertions of the rectus muscles revealed very considerable individual variations. The results are presented statistically.

Peter C. Kronfeld.

Nordmann J., and Stoll R. **The pigment cells of the choroid of the chick embryo.** Ophthalmologica **114**:99-102, Aug. 1947.

In the chick embryo the chromatophores of the choroid make their first appearance on the tenth day after fertilization. The development of the chromatophores appears to be related to that of the ciliary nerves and independent of the pigment epithelium of the retina.

Peter C. Kronfeld.

Sudakevitch, T. **The variations in the system of the trunks of the posterior ciliary arteries.** Brit. J. Ophth. **31**:738-760, Dec., 1947.

The variation in the anastomoses of the ophthalmic artery and its importance has not been emphasized in the literature. The ophthalmic artery may start as one or two trunks. Should the ophthalmic artery start from only the external carotid then anastomoses are essential and important for the functions of the eye. The role of the ophthalmic artery is not chiefly concerned with the central retinal artery, but mainly with the ciliary arteries. A definite order of branching of the long posterior ciliary arteries for sustaining a favorable correlation in the system of the ophthalmic artery from the hemodynamic point of view is very important. Most frequently, the first branch is the medial one of the long posterior ciliary arteries, with a common trunk with the central retinal artery.

In cases showing embryonic interruption in the trunk of the ophthalmic artery a variation was seen in the usual order of branching. Here, the medial branch of the long posterior ciliary artery was found in the second part, after the lacrimal artery. When this occurred na-

ture provided anastomoses and accessory branches. In some cases the posterior ciliary arteries may take part in the anastomoses themselves, making junction with the first and second parts and forming a new collateral way toward the posterior ciliary and neighboring arteries.

Intracranial interruptions of the ophthalmic arteries are of embryonic origin. The definite osseovascular correlation which develops in the narrow intracranial space in front of the optic canal is of extreme importance for normal eye function. (28 figures.) O. H. Ellis.

2

GENERAL PATHOLOGY, BACTERIOLOGY, IMMUNOLOGY

Missiroli, Giuseppe. **Allergometric investigations on patients suffering from probable tuberculous ocular disease.** Boll. d'ocul. **26**:171-178, March, 1947.

Continuing former investigations concerning the degree of cutaneous reaction to a tuberculin brand called "M.D.C. Terr." (Boll. d'ocul., Jan. 1947), the author compared the cutaneous reactions to this tuberculin in 17 patients affected by recurrent vitreous hemorrhages and in 11 patients with sympathetic ophthalmia. While in the latter group, most patients did not react to the 1 to 50,000 dilution—only one patient did—the patients with recurrent vitreous hemorrhages had positive cutaneous reactions even to dilutions of 1 to 100 million; 14 of these 17 patients reacted to dilutions of 1 to 100,000 and less. This seems to confirm the opinion of Stock and Axenfeld who, in 1909, postulated the tuberculous etiology of the recurrent vitreous hemorrhages. (1 table, 36 references.) K. W. Ascher.

Panzardi, Domenico. **Penicillin in the prophylaxis of postoperative infections of the eyeball.** Boll. d'ocul. **25**:501-519, Oct.-Dec., 1946. (See Section 5.)

Reiser, K. A. **The problems of intraocular tuberculosis.** Klin. Monatsbl. f. Augenh. **112**:1-12, May, 1947.

Intraocular tuberculosis has been a controversial subject because of the lack of sure diagnostic findings in the diseased eye. Many different diseases of the bulbus show similar clinical characteristics. Pathologic findings from the acute stage of the inflammatory process are scarce because the eyes are enucleated after, and not during, that stage, because of complications like secondary glaucoma. Therefore, the pathologist finds only the end result of the inflammatory process. Tubercle bacilli are only rarely found in these enucleated eyes and the histologically evident granulation tissue is not as pathognomonic as it once was thought to be. The clinical proof of the presence of a primary tuberculous focus is very difficult and frequently impossible, the Mantoux skin test is unreliable, a focal eye reaction after injections of greater doses of tuberculin is dangerous and, likewise, not foolproof and X-ray findings in the chest of persons with and without tuberculous eye disease are often identical. Serum reaction of the blood for tuberculosis as well as the isolation of tubercle bacilli from the blood are equally problematic. In spite of these uncertainties the author has no doubt of the existence of a true metastatic tuberculosis of the eye. He discusses four stages of investigation to make the diagnosis with certainty. The first stage embraces the general physical and laboratory examinations of the usual kind. A definite diagnosis is only rarely achieved and this stage usually ends with the diagnosis "uveitis of unknown etiology." During the second stage the findings are reviewed after removal of all possible foci of infection and after evaluation of the further course of the disease including resistance or response to treatment. At this point a diagnosis can often be made with probability. The third step embodies observa-

tion of long duration, sometimes after treatment in a sanatorium. Occasional hints of small, old tuberculous flare-ups in other parts of the body, recurrent attacks of the eye disease, changes in location of the ocular inflammatory process within the same eye and, again, evaluation of the therapeutic result are the considerations which make a diagnosis of clinically certain ocular tuberculosis possible. The fourth diagnostic stage is the positive proof of an active tuberculous lung process. The latter is found through repeated X-ray observation of seemingly inactive scars and glands over a long period of time. One then finds minute changes which correspond to caseous processes. The positive finding of bacilli in an enucleated eye belongs also to this last diagnostic part. The author states that, contrary to the old theories, lung tuberculosis and eye tuberculosis are actively co-existent in the same individual and that the disease in the two organs is only quantitatively, but not qualitatively, different. Max Hirschfelder.

Scholz, R. O., Cowie, D. B., and Wilde, W. S. **Studies on the physiology of the eye using tracer substances. Parts I and II.** Am. J. Ophth. **30**:1513-1526, Dec., 1947. (3 tables, 3 figures, 9 references, discussion.)

3

VEGETATIVE PHYSIOLOGY, BIOCHEMISTRY, PHARMACOLOGY, TOXICOLOGY

Bonhomme, C., and Ferrié J. **Changes in the lacrimal gland of the rabbit after the injection of pilocarpine.** Ophthalmologica **113**:316-318, May, 1947.

Under the designation of apical ergastoplasm the authors describe and depict certain transient histological changes that occur in the cytoplasm of the secretory cells of the lacrimal gland under the influence of pilocarpine.

Peter C. Kronfeld.

Davson, Hugh, and Quilliam, J. P. **The effects of nitrogen mustard on the permeability of the blood-aqueous humour barrier to Evans blue. An instance of the influence of a lesion in one eye on the susceptibility of the other.** Brit. J. Ophth. **31**:717-721, Dec., 1947.

The authors found that Evans blue injected intravenously does not appear in the aqueous of normal rabbits. After a solution of nitrogen mustard was instilled into the conjunctival sac of one eye the permeability of the blood-aqueous barrier was increased. Evans blue appeared in the anterior chamber of that eye and a ciliary injection appeared in the untreated eye. Solutions of different toxicity were used and the results showed that instillation of a high concentration of nitrogen mustard in one eye potentiates the action of a mild solution in the other eye by the reflex dilatation of the iris vessels.

O. H. Ellis.

Fischer, F. P. **Lens metabolism and cataract.** Ophthalmologica **114**:1-9, July, 1947.

Fischer reviews and tries to integrate some of the more recent work concerning the metabolism of the normal and cataractous lens. The two principal views concerning the pathogenesis of cataracts are: lens opacities result from disturbances of either the carbohydrate and mineral metabolism or from the internal respiration of the lens. Fischer shows that these two views are not irreconcilable. The various phases of the carbohydrate metabolism are represented in a rather complex diagram. "The cataractous lens is an asphyxiated lens." Peter C. Kronfeld.

Leopold, I. H., and Adler, F. H. **Specific treatment of ocular burns due to Lewisite (Beta-Chlorovinyldichloroarsine).** Arch. Ophth. **38**:174-181, Aug., 1947.

An effective antiarsenical agent, BAL

(2.3-dimercaptopropanol), was discovered and developed during the war years. It has been shown not only to be an effective therapeutic agent against arsenical war agents but also to be of value in the treatment of the various types of arsenical poisonings encountered in civilian practice.

The drug is irritating and produces ocular damage if used in concentrations greater than five percent or if repeatedly applied. It is recommended that it be applied once after the initial application. BAL is very effective in preventing severe ocular damage from Lewisite when applied promptly. It also has a specific effect on ocular lesions due to methyldichloroarsine, ethyldichloroarsine and phenyldichloroarsine and it has slight beneficial effect on lesions due to mustard gas (diethyl sulfide). The solvent and method of application is discussed in some detail. Apparently the use of 5-percent BAL in a special ointment base is most practical for military use.

John C. Long.

MacDonald, A. D. **Mydriatics: some developments.** Practitioner **158**:413-417, May, 1947.

All mydriatics of the belladonna group —atropine, homatropine, euphthalmine, and hyoscine—have the common feature that paralysis of accommodation is of shorter duration than the accompanying mydriasis. The mydriasis is not maximal and can be increased by the use of sympathomimetic drugs. Eumydrine, also a member of this family, differs in that the effect on accommodation is more prolonged. The sympathomimetic mydriatics, including adrenaline and ephedrine produce no cycloplegia and do not increase the ocular tension. Cocaine, a local anesthetic, has a definite mydriatic effect and enhances the mydriatic effect produced by atropine.

The antispasmotic drugs such as papaverine, syntropan and benadryl, have little mydriatic effect. There is a short discussion of the methods of investigation of drugs for the mydriatic effect, and of the history of attempts to synthesize mydriatic drugs. In these investigations it has been found that certain choline esters are powerful mydriatics, of shorter duration than atropine. One choline ester, used increasingly at present, is dibutolin. Thus far these choline esters have been used infrequently, usually as substitutes for atropine. Benjamin Milder.

Olcott, C. T. **Experimental argyrosis. III. Pigmentation of the eyes of rats following ingestion of silver during long periods of time.** Am. J. Path. **23**:783-792, Sept., 1947.

Ocular pigmentation due to the deposition of silver can be recognized during life and at autopsy in rats after ingestion of silver salts for long periods. The amount of pigmentation is directly related to the duration and intensity of the treatment. The zone of greatest pigmentation in the eye is the homogeneous layer of Bruch's membrane of the choroid and its continuation as the basal membrane of the epithelium of the ciliary body. Theodore M. Shapira.

Rosso, S. **The effect of acetylcholine shock on ocular tension and the retinal arterial pressure.** Rassegna ital. d'ottal. **16**:357-369, Sept.-Oct., 1947.

After reviewing the effects of convulsive treatment in schizophrenia by various other means, Rosso reports his observations after the injection of acetylcholine. In a group of 35 patients, aged 20 to 35 years, he studied particularly the variations of the general arterial pressure in relation to the behavior of the retinal vessels. In the second group of 16 patients he reports the relation of the general arterial pressure to that of the retinal arteries and to ocular tonus. Shock was

induced by the intravenous injection of 0.50 gm. of acetylcholine bromide, dissolved in distilled water. The average results were as follows: a fall of general systolic pressure of 20 mm. of Hg and a 10 mm. fall in the diastolic pressure; the retinal arterial pressure fell about 10 percent and showed rather marked oscillations, but returned to normal more rapidly than the general arterial pressure; there was a contraction of the central retinal artery of brief duration; the average fall of intraocular pressure was 5 mm. Eugene M. Blake.

Stutterheim, N. A. **Peripheral and central disturbances of the visual fields. An aspect of di-ophthalmology.** Brit. J. Ophth. **31**:721-730, Dec., 1947.

The author discribes in detail his observations on three patients in whom functional contraction of the visual fields of both eyes was present with diminished central vision, combined with various other symptoms of severe eyestrain. The condition is called astheno-vergence. Treatments using the kinetic principle rapidly cleared the condition.

O. H. Ellis.

Valerio, Mario. **Wetting agents in ophthalmology, with particular regard to their uses in ocular sulfamidotherapy.** Ann. di ottal. e clin. ocul. **72**:428-436, July, 1946.

By experiments made on rabbits, Valerio found that therapeutic concentrations of sulfonamides can be obtained in both the vitreous and the aqueous if a wetting agent is used, whether the sulfonamides are administered by iontophoresis or in an ointment.

Since the anesthetic percaine (nupercaine) is a very efficacious wetting agent he recommends its use in ½-percent solution with 2-percent epinephrine for maximal mydriasis in examination of the fundus. Harry K. Messenger.

Van Dyke, H. B. **Autonomic nervous system and action of drugs important in ophthalmology.** Arch. Ophth. **38**:145-153, Aug., 1947.

This is a general review of the pharmacology of the autonomic nervous system with special reference to the eye. For the purposes of the discussion, the older view that transmission of impulses depends on humoral agents, such as acetylcholine and substances closely related to epinephrine, has been adopted. The summary includes a very valuable outline of the action of the various ophthalmic drugs used for their action on the autonomic nervous system. John C. Long.

Vidal, F., Malbrán, J. L., and García Badaracco, J. **Neurocapillary test in experimental aniridia.** Arch. de oftal. de Buenos Aires **21**:105, April-June, 1946.

The authors studied the action of carbaminoylcholine chloride in experimental aniridia and partial iridectomy in the cat. The drug produces a rapid fall in the intraocular pressure in both eyes which later increases gradually and is lower in the operated eyes. These lower values are believed to be due to the reduction of the dialyzing vascular area. (Bibliography.)

Plinio Montalván.

4

PHYSIOLOGIC OPTICS, REFRACTION, COLOR VISION

Angius, T. **Research on accommodation.** Rassegna ital. d'ottal. **16**:370-376, Sept.-Oct., 1947.

The author devised and describes apparatus for measuring the near point of accommodation of each eye separately. With it he measured the power of accommodation of 1160 healthy young adults from 19 to 26 years of age and with normal vision. The normal power of accommodation for ages 19 to 20 is 11 D, and from 21 to 26 is 10 D. These values are

higher than those of Donders and close to those of Duane. (1 Figure.)

Eugene M. Blake.

Bucalossi, Antonio. **A subjective method for the study of the refracted light-bundle of the eye and the determination of the refraction.** Ann. di ottal. e clin. ocul. **72**:385-407, July, 1946.

The refraction of the eye can be determined by viewing a white object on a black background through a filter, half of which is of red glass and the other half of green, so placed in front of the eye that the line of separation between the two colored fields passes through the center of the pupil. An object thus viewed generally appears to be of the color resulting from the fusion of the two colors of the filter and to be surrounded by colored zones or bands which vary according to the refraction and aberration of the eye. Six diagrams for interpreting the numerous variations are given.

Harry K. Messenger.

Cotlier, I. **Subjective astigmatoscopy in the determination of astigmatism.** An. argent. de oftal. **7**:119-124, Oct.-Nov.-Dec., 1946.

Subjective astigmatoscopy is based on the examination of a point of white light which is seen as a diffusion line by an astigmatic eye. To perform the test the author utilizes a subjective kinescope in which a line of light is employed to determine the principal meridian of astigmia, by an apparent subjective lengthening or shortening of the constant source of linear light. Additional blue or red filters may be used for further refinement, especially in cases with hypermetropia. Lenses are then placed before the eye until the dispersion and lengthening effects due to the astigmia are made to disappear. (2 figures, bibliography).

Edward Saskin.

Cross, A. G. **Contact lenses.** Practitioner **158**:406-412, May, 1947.

This survey of the present status of contact lenses includes a brief description of their history from the original blown glass lenses to the present plastic contact lenses. The author discusses the advantages, cosmetic and industrial, of contact lenses. Indications for use include asymmetric ametropia, keratoconus, corneal irregularities due to scarring, and monocular aphakia. In addition, therapeutic indications include lagophthalmos and neuroparalytic keratitis. Eyes with recurrent erosions and trichiasis have been benefited by contact lenses. The cosmetic indications are discussed.

The author describes Zeiss lenses, and describes the method of individual fitting of contact lenses. Tolerance to contact lenses varies greatly. The author feels that with cut plastic lenses it is possible to insure at least four hours a day of comfortable wear. He emphasizes the importance of careful selection of candidates for the wearing of contact lenses.

Benjamin Milder.

Duke Elder, Sir Stewart. **Eye strain.** Practitioner **158**:377-382, May, 1947.

The author defines "eye strain" as the effort of the visual apparatus to clarify vision by ineffectual adjustments. Among the factors which cause eye strain, the author emphasizes faulty illumination and the fineness of the work done. More important, however, are ocular defects which produce eye strain. Chief among these are error of refraction and presbyopia and also accommodation, convergence, muscular impairments and aniseikonia. Eye strain is commonly the result of efforts to compensate for relatively small ocular defects. The more ready appearance of asthenopic symptoms in people who are subject to other strains and stresses, both physical and psychic, is emphasized. Treatment is principally

optic, but the author warns against the indiscriminate correction of errors of refraction which are not producing symptoms. Benjamin Milder.

Eyles, Marianne. **Functional home exercises in cases of eyestrain.** Am. J. Ophth. **31**:45-48, Jan., 1948. (3 figures.)

Fink, W. H. **The vergence test—an evaluation of the various techniques.** Am. J. Ophth. **31**:49-57, Jan., 1948. (2 figures.)

Foddis, Antonio. **Concerning central scotomata encountered in certain secondary cataracts.** Boll d'ocul. **26**:87-97, Feb., 1947.

In the 1943 volume of the same journal (no. 8-10, p. 479) Focosi discussed the visual disturbances observed in certain cases of secondary cataract; the present paper is devoted to a mathematical analysis of the phenomenon. (4 figures.)

K. W. Ascher.

Fuchs, Adalbert. **Myopia inversa.** Arch. Ophth. **37**:722-739, June, 1947.

In occasional eyes changes occur at the disc which resemble the nasal conus of myopia but which are something quite different. In these cases, on the nasal side of the optic nerve one finds changes which look exactly like those on the temporal side of the optic nerve in cases of high myopia, namely, large atrophic zones of the choroid (circumpapillary atrophy), which extend toward the nasal side more than toward the temporal side. As such eyes are myopic, the author proposes to call these changes "myopia inversa." The distribution of the vessels is nearly always inverted. Pronounced supertraction of the temporal margin of the disc is not ordinarily present. Fourteen cases of this condition are described in detail with sketches of the disc.

John C. Long.

Iribas, Gregorio, **Contact lenses in ophthalmology.** Arch. Soc. oft. hisp.-amer. **7**:797-807, Aug., 1947.

No new viewpoints on contact lenses are presented. The author prefers fitting with Obrig's trial set of plastic lenses. He finds individual molds of the eyeball unnecessary. The mathematical data on the computation of the refractive correction from the data furnished by the trial-case refraction, the measurement with the ophthalmometer, and the distance between the correcting lens and the anterior corneal surface are presented.

Ray K. Daily.

MacDonald, J. G. **Spasm of accommodation.** Supp. New Zealand, M.J. 1947, pp. 39-42, 1947.

Spasm of accommodation simulates myopia, gives rise to annoying blurring of vision, and should be treated by the daily use of atropine. Irwin E. Gaynon.

Maione, Mario. **The action of simultaneous multiple luminous stimuli on the retinal function. (Experimental researches.)** Ann. di ottal. e clin. ocul. **72**: 467-490, Aug. 1946.

Maione performed a series of experiments designed to elucidate the functional relations between various parts of the retina. Using double targets (red-green, red-white, green-white) specially calibrated with respect to luminous intensity he found that the extent of the visual field for a given color is reduced when the target presents simultaneously another stimulus of the same luminous intensity. In a second group of experiments he found that a luminous stimulus on one part of the retina weakens the action of a simultaneous luminous stimulus on another part. With a special device he studied the variation in macular visual acuity when the periphery of the retina is stimulated, and found that the more in-

tense the peripheral stimulus the less the central visual acuity.

As a working hypothesis Maione considers the retina to possess a definite energy potential, the discharge of which upon the optic nerve is determined by the characteristics of the stimuli.

Harry K. Messenger.

Moron-Salas, José. **Two problems in refraction.** Arch. Soc. oft. hisp.-amer. 7: 741-755, Aug., 1947.

Moron-Salas discusses aniseiconia, and the use of the cross cylinder. For the diagnosis of aniseiconia, he uses the Maddox eiconometer which is described in detail. Size glasses are not available in Europe, and the author attempts to equalize the size of the retinal images by the thickness and position of the lenses. The enlargement of the image increases in direct proportion to the thickness of the lens, and inversely to the radius of curvature. The apparent size of the object increases if the lens is placed with its concave surface towards the eye, and diminishes if the lens is placed with the convex surface towards the eye. In cases of unilateral myopia the aniseiconia can be reduced by reducing the distance of the correcting lens from the eye.

The use of cross cylinders is described, and attention is called to the possibility of error, pointed out by Williamson Noble, caused by the fact that vertical lines are seen more distinctly if the vertical meridian of the eye has the strongest refraction. To avoid this error the author suggests that in using the cross cylinder, patients be asked to look at letters or numbers in which curved lines predominate, such as, 3, 6, 8, 9, o, c, and g. (3 illustrations, 1 table.) Ray K. Daily.

Pannevis M. **The brightness of positive after-images.** Ophthalmologica **113**:280-289, May, 1947.

The purpose of this study was to follow and define the course of positive after-images by measuring their brightness. These measurements are made by "projecting" the after-image onto a screen the brightness of which can be varied and measured. If the screen is brighter than the after-image the latter immediately changes from light to dark. This phenomenon is only an induced change in brightness and not a change from a positive to a negative after-image. The decrease in brightness, that is, the fading of a positive after-image can be expressed by a relatively simple formula. Peripheral after-images (following stimulation of a peripheral retinal area) are less intense and fade out more quickly than central ones. The area of a central scotoma often proves incapable of producing after-images. During the recovery of central vision the more peripheral portion of the scotomatous area regains its capacity of producing after-images sooner than the more central portions.

Peter C. Kronfeld.

Park, G. E. **Reading difficulty (dyslexia) from the ophthalmic point of view.** Am. J. Ophth. **31**:28-34, Jan., 1948. (2 tables, 9 references.)

Weidmann W. **The sharpness of the subjective visual images.** Ophthalmologica **114**:33-43, July, 1947.

The various physiological aberrations and imperfections of the emmetropic eye lead to a degree of blurring of the retinal images that is comparable to that produced by an ametropia of about 2 diopters. Nevertheless, the subjective visual images are sharp and there is no subjective awareness of the fact that the retinal images consist of or, at least, are outlined by diffusion circles. With a simple experimental arrangement the author has studied the effect of partly overlapping diffusion circles (DC) upon the subjective

impression. If two DC of different brightness overlap partly on the peripheral retina, no summation of the two stimuli occurs in the area of the overlap. Instead, the stronger (brighter) stimulus suppresses the weaker one. Barely eccentric DC suffer the same fate if they overlap partly with a central (macular) DC. Similar rules apply to colored DC: The more brightly colored DC extinguishes the weaker stimulus in the area of the overlap. Summation occurs only if two DC of the same color and brightness overlap. Another consequence of the physiological interactions between DC or double stimulations of retinal areas is the apparent enlargement by the radius of the DC of any bright object seen against a dark background, due to the suppression of the darker DC. These phenomena account for the subjective sharpness of visual images.

Peter C. Kronfeld.

5

DIAGNOSIS AND THERAPY

Bailliart, P. **Reflections on ophthalmoscopy.** Ann. d'ocul. **180**:449-456, Aug., 1947.

The redness of the normal fundus depends on the quantity and quality of its reflected light which enters the observer's eye. The choroid, including its vessels and pigment, acts as a colored screen which absorbs most light except red. The interposition of fluids or solids between the choroidal screen and the transparent retinal screen changes the fundus color values in retinal detachment. Monochromatic light including red-free causes the nerve fibers, interstitial tissues and vessels to appear more distinct and of a different color because these tissues are less permeable to light of short wave length.

In the ordinary electric ophthalmoscope, the observer uses a wide range of wave length. Retinal pigment epithelium loss increases distinctness because of the increased light which penetrates the choriocapillaris, the reflected color appearing brighter. Absence of the choriocapillaris renders only the larger vessels and interspaces visible with a variable amount of pigment which may appear gray, black or brown. Detached pigment epithelium migrates to the nearest retinal vessels, following the course of the interstitial intra-ocular fluid which is from the choroid to the vitreous. The fundus appears more dull and slightly opaque after the absorption of pigment from the retinal pigment epithelium.

Magnifications of 10 to 14 diameters are afforded by direct ophthalmoscopy. The central retinal artery is about 90 μ in diameter and vessels as small as 20 to 30 μ are visible under favorable conditions. The normal granular appearance of the fundus is ascribed to the hexagonal shape of the cells of the pigment epithelium, about 15 to 30 μ in diameter. The crystalline appearance frequently observed in perimacular exudation is caused by the increased fluids in the underlying choriocapillaris. In estimating fundus depth lesions are best aligned with the blood vessel planes. The larger vessels are in the nerve fiber layer and the smaller vessels extend to the internal granular layer. Pigment epithelium lesions are external to the retinal vssels. In myopia tension causes the retinal pigment layer to reflect more light and the fundus to appear more transparent and the details more distinct. The partial or total loss of the pigment epithelium tends to make the fundus appear lighter and brighter. Unfortunately, quantitative and qualitative changes in the interstitial fluids of the fundus, which play an important part in disease, cannot be studied in histologic sections. The fundus in life and death is quite different. Only with the ophthalmoscope can the cellular and interstitial tissues in health and disease be observed and interpreted.

Chas. A. Bahn

Boyd Law, T. **Intraocular infection and penicillin.** M. J. Australia **2**:298, Sept. 6, 1947.

The author presents one case of a woman who had unilateral cataract surgery; the ultimate result was a slight prolapse of the pillars of the iris which was treated with trichloracetic acid. Visual acuity was 6/12 with correction. When next observed 14 months later there was an infection of the anterior chamber of the eye which had gained access along one of the prolapsed pillars. Intramuscular injections of penicillin were given, first 50,000 units and then 15,000 units every 4 hours, penicillin drops were instilled in the eye (1,000 units per millilitre) every 15 minutes for 5 hours, then every hour, and atropine was instilled. The eye did not respond. A kerotome incision was made and some of the penicillin solution was used to wash out the anterior chamber with a lachrymal syringe. This was repeated the next two days. Intramuscular injection of penicillin was continued until she received 1,000,000 units and penicillin drops were instilled several times daily. The eye responded rapidly and the patient was discharged 17 days later.

When next examined five months later, the pupil had contracted slightly, the eye was free of inflammation, and the lens capsule in the pupillary area was only slightly more dense than before the infection. A discussion was done and, through the gap obtained, a good view of the fundus showed no evidence of any damage in the posterior segment of the eye. Corrected visual acuity was 6/24.

Theodore M. Shapira.

Grignolo, Antonio. **Vivicillin for eye affections.** Boll. d'ocul. **26**:179-188, March, 1947.

In 1944, Enoch and Wallersteiner described the inhibitory action on penicillin-resistant microorganisms of an antibiotic they called vivicillin, a suspension of living filaments of Penicillium notatum. A similar, possibly even identical, preparation was obtained from B. babudieri from the Instituto Superiore di Sanita in Rome and was used for treatment of blepharitis ulcerosa as well as squammosa, of catarrhal and of purulent conjunctivitis, of pseudomembranous, angular, and lymphatic conjunctivitis, keratitis, corneal ulcers, dacryocystitis, iridocyclitis, infected ocular wounds and postoperative infections. The application was either local, in drops, eye bath, or compresses, or general, by intramuscular injection. Excellent results were obtained in ulcerous blepharitis, which recurred nevertheless. Conjunctivitis caused by streptococci, staphylococci, Morax-Axenfeld diplobacilli, and infected wounds of the eye responded favorably. Lymphatic keratoconjunctivitis, dakryocystitis, gonorrheal conjunctivitis, Koch-Weeks conjunctivitis, corneal ulcers, and iridocyclitis did not respond to this therapy.

K. W. Ascher.

Panzardi, Domenico. **Penicillin in the prophylaxis of postoperative infections of the eyeball.** Boll. d'ocul. **25**:501-519, Oct.-Dec., 1946.

The writer reports in tabulated form the results obtained in 55 intraocular and 25 extraocular operations on eyes in which the cultures had shown the presence of the staphylocci, streptococci, the micrococcus catarrhalis, the pneumococcus, the xerosis bacillus, the Morax-Axenfeld diplococcus and the Koch-Weeks bacillus. The use of penicillin in collyrium or ointment every four to six hours for one to three days destroyed the germs of the conjunctiva more completely than any other drug. Even after this short treatment cultures were sterile for 4 to 8 days which is long enough to prevent secondary infection of the wound. The tolerance of the eye to penicillin was good

for the duration of the postoperative treatment. However, the prophylaxis of surgical infections can be completed by the internal use of a sulfamide a day before and the two days after operation. (Bibliography.) Melchiore Lombardo.

Seidenari, Renato. **An ophthalmoscope lamp for retinal detachment.** Ann. di ottal. e clin. ocul. **72**:491-494, Aug., 1946.

For facilitating the finding of retinal tears Seidenari presents a simplified electric ophthalmoscope for examination of the fundus by the indirect method. The light source is much more powerful than in the ordinary electric ophthalmoscope. Chromatic aberration is almost completely eliminated by the use of two condensing lenses with an interposed diaphragm.

Harry K. Messenger.

6

OCULAR MOTILITY

Martínez, Luis, Jr. **A case of fixed strabismus.** Am. J. Ophth. **31**:80-81, Jan., 1948. (2 figures.)

McGuire, W. P. **The surgical correction of paresis of the superior oblique.** Am. J. Ophth. **31**:65-77, Jan., 1948. (6 figures, 49 references.)

Smith, James W. **The problem of strabismus in childhood. With special reference to convergent strabismus in infancy and early childhood.** Am. J. Ophth. **31**:85-89, Jan., 1948. (7 references.)

Verhoeff, F. H. **Problems concerning convergence.** Tr. Am. Acad. Ophth. pp. 15-19, Sept.-Oct., 1947.

If each eye moved independently, bifixation would be a simple matter if and when it became advantageous, and a special convergence mechanism would be unnecessary. The two eyes move precisely together as though mechanically connected, though the exact manner of the operation of this function is practically unknown. When an eye is directed downward and inward by the conjugate mechanism without the help of convergence, it undergoes relative extortion. When the inward movement is produced by the convergence mechanism, the eye undergoes intorsion. Convergence is, therefore, accomplished by the internal rectus muscles together with reduced innervation or inhibition of their antagonists. An eye can move further inward by conjugate action than by convergence. After maximal symmetrical convergence has been obtained through bifixation of an object in the midline, one eye at a time can be turned still further inward by carrying the fixation to the left for the right eye and vice-versa for the left, while bifixation is still maintained. Convergence is more restricted than conjugate motion because the convergence mechanism has only the internal rectus to turn an eye whereas the conjugate mechanism has in addition the help of the other ocular muscles, notably the superior and inferior rectus muscles. The other factors involved are: insufficient inhibition of the external rectus and the utilization of two different physiologic mechanisms, each with its separate muscle fibers and/or innervation.

Convergence is primarily involuntary although more or less voluntary control is frequently acquired, but is not used in ordinary vision. Convergence can seldom be disassociated from accommodation. The convergence necessary for bifixation is normally accomplished through accommodation, distance sense, and disparateness of the fixation object images. These factors cannot be completely disassociated. The deviation of an occluded eye when viewing a distant object through a concave lens proves that accommodation causes convergence. The distance sense hampers the convergence effect of accommodation because the fixated object con-

tinues to appear distant. The effect of nearness can be demonstrated by looking with one eye occluded at a near object through a convex lens which prevents accommodation. The occluded eye converges, but far from enough, although the convex lens makes the object appear nearer than it actually is.

When the convergence effect of accommodation is the same for each eye separately, it is probably also the same when both eyes are used. This is not true for the distance sense because the distance of the near object does not appear the same with one eye occluded as with both eyes open. The effect of disparate images can be studied with a stereoscope or with two dots on a card. When these approach each other by convergence, or relative divergence, with strong attention the two images unite and stay united without effort on the part of the observer. Thus the effect of accommodation or distance sense on convergence cannot be completely nullified.

Conscious concepts of depth are not produced by disparate images but unconsciously there may be depth perception which is associated with convergence or divergence. Binocular fixation is inversely proportionate to the image differences and in very near vision produced by efforts of accommodation and distance sense. In ordinary vision, convergence is involuntary and is produced partially by a sensory factor which is entirely subconscious.

Perlia's nucleus is involved in convergence but its method of function is not understood. Apparently it equalizes stimuli to the internal rectus muscles. Perlia's nucleus is apparently connected with the probable centers of pupillary contraction and accommodation. The association between convergence and accommodation is, generally speaking, hereditary and not acquired. In many patients with convergence strabismus since infancy, accommodation causes increased convergence. There is apparently no divergence center. Chas. A. Bahn.

7

CONJUNCTIVA, CORNEA, SCLERA

Arriaga Cantullera, José. **Sulfanimides and trachoma.** Arch. Soc. oft. hisp.-amer. 7:787-796, Aug., 1947.

The author reviews the literature, and reports his own investigations. One study comprises a group of 34 children in the first and second stages of trachoma treated in an orphanage. They were given a sulfa preparation internally, and a sulfa ointment locally. At the end of 20 days, 19 were discharged as cured, and the other 15 were treated for ten days longer; at that time they too were clinically cured. Reexamined at the end of one year, 30 were found cured, with smooth tarsal conjunctiva, and pale eyes. Two had follicles, without subjective symptoms and two had no follicles, but presented signs suggestive of trachoma, such as lacrimation, conjunctival congestion, and abnormalities in the tarsal vessels. In summary, 19 patients were cured with 30 to 40 grams of the drug, and 15 required from 45 to 55 grams. In an ambulatory group of patients treated in the same manner, the results were inferior to those obtained at the orphanage, which seems to indicate that other factors, such as hygienic surroundings, or proper nutrition play a part in the results obtained.

Another investigation concerned the effect of Irgafen, a sulfa preparation which, because of its affinity for blood plasma, produces a higher blood concentration with smaller doses. It was used in 60 patients in various stages of trachoma. The dose of Irgafen was half of that used with the other sulfa drugs. Of Irgafen 20 grams were administered during a period of three weeks; 10 grams were given in the first week, and after a week's interval 10 grams were given during the third

week. Tabulated data show that 68.33 percent of the patients were cured, and 21.24 percent improved. One patient, who failed to respond to the continuous administration of 40 grams of the drug, was given a subconjunctival injection of Irgamid. The injection was so painful, and the reaction of the lids so marked, that the patient did not return for further therapy. Seen three months later she was found cured. One patient was sensitive to sulfa drugs, and the treatment had to be abandoned. Arriaga concludes that the sulfa drugs act not only on the trachomatous complications and secondary infections, but exert a direct curative effect on the trachomatous process itself. (Bibliography.) Ray K. Daily.

Casari, G. F. **A case of aphthous conjunctivitis.** Rassegna ital. d'ottal. **16**:377-385, Sept.-Oct., 1947.

A 38-year-old woman developed aphthae of the oral and vaginal mucosa, together with a polymorphous cutaneous erythema and a bilateral acute conjunctivitis. The condition was recurrent, but healed completely. The etiology was considered to be a tuberculous allergy.

Eugene M. Blake.

Colombo, G. L. **Rickettsial corpuscles in numular conjunctivitis.** Ann. d'ocul. **180**: 470-474, Aug., 1947.

In a previous article the author reported the observation of rickettsial bodies in three cases of epidemic numular conjunctivitis, which term is preferred to epidemic keratoconjunctivitis.

The condition was exceptionally frequent in Italy during 1946 and was observed especially in returned prisoners from Germany and India. The characteristic symptoms include spontaneous pain, inflammation and swelling of the preauricular glands as well as catarrhal conjunctivitis with marked edema and follliculosis especially in the semilunar fold and caruncle. The inferior conjunctiva is usually more inflamed and contains more follicles. The conjunctiva of the upper lid is relatively normal. In this respect this conjunctivitis differs from another rickettsial disease, trachoma. The exudation is catarrhal.

The technique used for biologic cellular examination includes grattage after cocainization. The scrapings containing the epithelial cells are placed on several slides, and after fixation in ether and methyl alcohol are stained with Giemsa-Romanowski stain. The epithelial cells have violet nuclei and rose-pink protoplasm, while the rickettsial bodies are blue. The rickettsial bodies vary from 2 to 3 μ and the grouped masses from 200 to 300 μ in size. The latter appear as triangular caps on the nuclei or slightly separated as single or divided groups.

The author has not observed similar findings in conjunctival inflammations caused by other rickettsial diseases, which include trachoma, conjunctivitis of the new-born, and swimming pool conjunctivitis. The clinical differences strongly suggest that several types of the rickettsial group are involved. All differ from bacteria in morphology, in staining reaction, and chemically, in their agglutinin, precipitin, and amboceptor reactions. Clinical and pathological differences between the bacterial and rickettsial diseases are more or less marked. The conjunctival exudates in the latter consist almost exclusively of small monocular leucocytes.

The presence of rickettsial bodies has been observed by the author in numerous cases of numular keratoconjunctivitis which is considered a pathologic and clinical entity. Chas. A. Bahn.

Coverdale, Howard. **Ocular lesion associated with dendritic ulcer.** Supp. New Zealand M. J. p. 31, 1947.

Ten cases are presented illustrating the

association of dendritic ulcer with herpes facialis, superficial punctate keratitis, disciform keratitis, keratitis profunda, and iridocyclitis. Irwin E. Gaynon.

Godfrey-Smith, R. A. **Reiter's syndrome.** M.J. Australia **2**:574-575, Nov. 8, 1947.

The author adds another report to the growing list of cases of Reiter's disease, a syndrome that consists of non-specific urethritis, polyarthritis and cojunctivitis. The association of this syndrome with bacillary dysentery has been suggested. F. H. Haessler.

Grossmann, E. E. **Treatment of corneal ulcer with blood and blood plasma.** Arch. Ophth. **37**:779-781, June, 1947.

The cornea is avascular and derives its nourishment by dialysis from the perilimbal plexus. For this reason, healing of corneal infections may become sluggish and prolonged. It is also notable that frequently lesions of the cornea clear up only after vascularization has occurred. In view of the lack of an adequate nutrient supply system in the cornea, it would appear logical to apply the needed nutrient elements directly to the cornea in the form of drops of either whole blood or plasma. Gratifying results have been obtained when blood was used in paste form in several cases of indolent decubitus ulcers and in infected wounds. Six cases of corneal disease are briefly described, in which treatment consisted of the application of either blood plasma or whole blood. Good results were obtained. John C. Long.

Jayle, G. E. **Transfixing grafts of the cornea in the infant and adolescent.** Arch. d'opht. **7**:148-155, 1947.

Jayle reviews the history of corneal grafts from the time of von Hippel in 1888 to the present time. He concludes that the current success of the operation as contrasted with earlier failures is due to minor changes in technique, to improvement in anaesthesia and akinesis, and to the great improvement in control of bacterial infection, rather than to any fundamental changes. The author then describes in detail his own operative technique and offers two illustrative cases to show the indications for operation and the handling of complications. Among all the possible complications he stresses the relative importance of glaucoma and advocates trephining for its control and even as a means of prophylaxis in certain cases. He notes that successful grafts are possible even in the very young. Phillips Thygeson.

Klauder, J. V. **Treatment of interstitial keratitis with particular reference to the results of penicillin therapy.** Am. J. Syph., Gonor. and Ven. Dis. **31**:575-599, Nov., 1947.

Seventy-two patients with interstitial keratitis were treated with penicillin.

The addition of penicillin to the therapy of interstitial keratitis does not give results superior to other forms of treatment, such as fever-chemotherapy without penicillin and no treatment eliminates the devastating effect of the disease. (5 tables, references.) Bennett W. Muir.

Scuderi, G. **Leishmaniasis of the eyelid associated with keratitis.** Rassegna ital. d'ottal. **16**:335-356, Sept.-Oct., 1947. (See Section 15.)

Shuttleworth, F. N., and Benstead, J. G. **Primary meningococcal ophthalmia.** Brit. M. J. pp. 568-569, Oct. 11, 1947.

Attention is drawn to the importance of recognizing the meningococcus as a primary cause of conjunctivitis.

Two cases in Leeds school children are described. One patient was eventually treated with local application of sulfacetamide and the second with penicillin with

good results. Some aspects of the literature are discussed.

Theodore M. Shapira.

Stern, H. J. **Acute ocular manifestations of riboflavin deficiency.** Ophthalmologica **114**:103-106, Aug., 1947.

A white woman, 52 years of age, presented herself in the Eye Clinic of the Hadassah University Hospital in Jerusalem because of redness, burning and itching of both eyes of several days' duration. Her diet had been very low in riboflavin for many months. Ophthalmological examination revealed marked congestion of the bulbar conjunctiva and of the marginal vascular plexus of the cornea. From the latter fine radial vessels invaded the subepithelial layers of the cornea for as much as 3 mm. The peripheral rim of the cornea was slightly edematous. Under riboflavin treatment by mouth (5 mg. three times daily) the eye improved dramatically. Peter C. Kronfeld.

Vancea, P. **Electrometric variations of the tissue pH in trachoma.** Arch. d'ophth. 7:156-160, 1947.

Vancea reports on the variations in tissue pH observed in 16 cases of trachoma before and after treatment, as recorded by the ionometer of Brehmer. He found the normal tissue pH values to vary from 7.90 to 8.10 according to the part of the conjunctiva studied. In contrast, the average pH of the 16 trachomatous conjunctivas of the upper cul-de-sac measured 7.42; in the same individuals the average pH of the unaffected bulbar conjunctivas was 8.01. After follicular expressions the pH of the trachomatous conjunctivas rose to an average of 7.95 which is considered normal. Vancea concludes that under the influence of trachoma virus there occurs an acidification of the affected tissues which disappears under treatment. This return to normal pH precedes the actual healing of the disease. Phillips Thygeson.

Venco, Luigi. **Considerations on the various phases of the process of union of homoplastic corneal transplants.** Ann. di ottal. e clin. ocul. **72**:513-545, Sept., 1946.

From his clinical observation of 67 homoplastic transplants Venco distinguishes five phases or stages in the union of the implant with the recipient cornea. These phases arise at varying intervals after the keratoplasty and vary greatly in their severity. Complications, whether operative or postoperative, are excluded from consideration.

The first phase ("hydration of the implant") occurs invariably. At the first dressing both the implant and the recipient cornea are found to be opalescent and obviously swollen. The hydration usually disappears, at least macroscopically, within the first ten days.

The second phase ("inflammatory reactions") includes the usual phenomena of ocular inflammation which may vary greatly but usually subside in 10 to 20 days. These are linked with the process of cicatrization of the corneal wound, with the interaction between the implant and the surrounding tissue, and with the "ergic" status or reactive capacity of the individual. Vascularization of the recipient cornea is more or less constant in this stage, but ordinarily the newly formed vessels do not extend into the implant.

The third or "postvital" phase occurs in 18 to 24 days and seems to mark the limit of the survival of the implant, which henceforth is subject to new metabolic relations. Union between it and the cornea has been established. The phenomena which occur in this stage are of capital importance for the success of the keratoplasty and are attributed to the inevitable regressive processes of autolysis and autodigestion of dead tissue. In this phase the implant may become vascu-

larized and more or less opaque, and the changes are reversible only in part. The larger the implant the more severe these regressive changes are likly to be. Venco believes that frequent instillations of dilute hydrogen peroxide are of value in combating the tissue anoxia in this stage.

The fourth phase, which is inconstant, comprises various "tissue phenomena" attending the gradual transformation undergone by the implant in its new seat. These changes, manifested clinically by vascularization or loss of transparency, are usually not attended by inflammation and may occur months after the keratoplasty. In general, if the transplant is successful at the end of a year it is likely to continue so, barring those changes included in the fifth phase.

The fifth phase of "remote disturbances," is likewise inconstant, but frequently occurs because the implant behaves as a locus minoris resistentiae. The implant is prone to be affected by dystrophies, inflammations, and other morbid processes. (50 references.)

Harry K. Messenger.

8

UVEA, SYMPATHETIC DISEASE, AQUEOUS

Campos, Raffaele. **A case of choroidal angioma with ossification of the lamina vitrea.** Boll. d'ocul. **26**:145-170, March, 1947.

A 12-year-old boy with an angioma (nevus flammeus) of the right side of his face was admitted for the purpose of an extraction of his right lens for traumatic cataract. When five years old he was hit in that eye and this trauma caused an apparently uncomplicated traumatic cataract. Uncertain light projection was the only suspicious sign, and a linear extraction was performed with abundant hemorrhage. Bleeding continued and the eye was enucleated 16 days after the extraction. Four weeks after the enucleation of the right bulbus, an inflammation, most probably sympathetic ophthalmia, developed in the left eye. This inflammation healed within seven weeks under local mydriatic and dionine treatment, with application of leaches, and chinophenyl and urotropin injections followed by mercury ointment as for secondary lues. Blood Wassermann and tuberculin tests were negative. An extensive description of the histopathologic findings is supplemented by six photomicrographs. Near the optic nerve head of the enucleated eye, uveal angiomatosis with fibrous and bony tissue formation was noted. Degenerative processes of the lamina vitrea such as Kuhnt-Junius disease and angioid streaks are discussed. (36 references.)

K. W. Ascher.

Laval, Joseph. **Subretinal hemorrhage simulating sarcoma of the choroid.** Am. J. Ophth. **31**:82-83, Jan., 1948. (2 figures.)

Lees, V. T. **A case of metastatic osteosarcoma in the choroid.** Brit. J. Ophth. **31**: 713-716, Dec., 1947.

The author presents a case of the first recorded instance of metastatic osteosarcoma in the eye. The occurrence of intraocular metastatic sarcoma is unusual. The postmortem specimens showed such a distinctive cell pattern of trabeculae of osteoid tissue with the tumor cells in the interstices, that it was possible from that alone to diagnose bone sarcoma without reference to the history of osteosarcoma of the knee for which amputation had been performed.

O. H. Ellis.

Lemoine, P. **Acute iritis and allergy.** Arch. d'opht. **7**:161-166, 1947.

The author notes that there has been an increasing tendency to consider allergy as a cause of ocular inflammations of uncertain etiology. He then reviews the theories of the mechanism of allergy, with particular reference to the liberation

of histamine, and suggests that allergy may be concerned in acute iritis and that it may indeed be the cause of the initial symptoms in the majority of cases in spite of primary involvement with an infectious agent. On the basis of this hypothesis Lemoine subjected 30 patients to antiallergic therapy consisting of a series of intravenous injections of hyposulfate of sodium. He kept a control group on the customary local therapy alone. In the group treated antiallergically there was rapid diminution in inflammation, relief from pain, and rapid improvement in vision. No signs of intolerance to the drug were noted. From 9 to 12 injections were usually administered. He concludes that the therapeutic results obtained favor his hypothesis. Phillips Thygeson.

McPherson, S. D., Jr., and Woods, A. C. **The significance of the intracutaneous test for hypersensitivity to uveal pigment.** Am. J. Ophth. **31**:35-45, Jan., 1948. (7 figures, 4 tables.)

Samuels, B. **The problem of sympathetic ophthalmia.** Irish J. M. Sc. pp. 610-621, Oct., 1947.

The etiology, pathology, pathogenesis, diagnosis and treatment of sympathetic ophthalmia is discussed. Secondary glaucoma in the sympathizing eye should be treated by repeated paracentesis.

Irwin E. Gaynon.

Sédan, J. **Large unilateral stromal hypoplasia of the iris.** Ann. d'ocul. **180**:466-469, Aug., 1947.

This constitutional anomaly usually involves the lower part of iris and the pupil is round. In the case reported the temporal quadrant of the iris was hypoplastic and the pupil was flat on the temporal side.

A dark brown triangular area, in the temporal quadrant of an otherwise blue iris, was observed in a Polish woman aged 23 years. The brown area was practically level with the remaining iris and contained several concentric folds. The temporal pupillary flatness persisted in mydriasis. Otherwise both eyes were structurally and functionally normal. This type of pupillary flatness is usually traumatic. No change had been observed in the iris and pupil by several ophthalmologists who had examined the patient since birth. The lesion is probably congenital and not progressive. (1 figure.)

Chas. A. Bahn.

9

GLAUCOMA AND OCULAR TENSION

Chandler, P. A., and Johnson, C. C. **A neglected cause of secondary glaucoma in eyes in which the lens is absent or subluxated.** Arch. Ophth. **37**:740-771, June, 1947.

A form of secondary glaucoma in aphakic eyes and in eyes with dislocated lenses is discussed, in which the causative factor is apparently a block between the anterior and the posterior chamber. This block may arise from a membrane partly or wholly inflammatory, from the herniation of vitreous through the pupil acting as a plug, or from adhesion of the iris to an intact hyaloid membrane.

Treatment consists of the re-establishment of communication between the chambers by the use of a mydriatic, by discission of a pupillary membrane, by transfixion of the iris or by iridectomy. Treatment should be begun early before permanent peripheral anterior synechias are formed. A block of the pupil by vitreous in an aphakic eye, or one with posterior dislocation of the lens, with resultant increased pressure in the posterior chamber, is the probable cause of large accumulations of vitreous in the anterior chamber. In aphakic eyes in which the pupil is completely blocked by a membrane, it is advisable to do preliminary transfixion of the iris before undertaking

a discission of the membrane. Fourteen illustrative cases are presented.

John C. Long.

Cristini, Giuseppe. **The action of Roentgentherapy on the sympathetic centers of the medulla in glaucoma.** Riv. oto-neuro-oftal., **22**:124-147, March-April, 1947.

Nine cases of glaucoma are reported in patients 41 to 70 years of age. Seven of the patients were male. The vision, tension, conditions of the fundus, the condition of the fields, and their changes after treatment are given in detail. A resume of the result obtained is given with a discussion on the effect on three cardinal symptoms of glaucoma: hypertension, optic atrophy and campimetric changes. It is concluded that irradiation of the medullary sympathetic centers and the ciliospinal center of Budge leads to results as satisfactory as after treatment now used in similar cases. (16 figures, bibliography.) Melchiore Lombardo.

François, J. **Glaucoma and cataract.** Ann. d'ocul. **180**:457-465, Aug., 1947.

Cataract may cause or be caused by glaucoma, or their co-existence may be coincidental. The probable duration of each is measured in part by changes in the visual fields and the pupils which are important diagnostically.

In chronic glaucoma with beginning cataract a preliminary iris inclusion operation is preferred. The lens extraction can follow if and when the attendant risks are justified.

If an eye that has been operated upon for chronic glaucoma has an operable cataract, the decision to remove the cataract depends upon the surgical risks involved. Obviously, higher risks are justified if necessary to afford or maintain slight sight. Intracapsular extraction, especially if preceded by capsular micropuncture, is less apt to be followed by secondary uveitis. Suction, even in the hands of those who can use it efficiently, has the disadvantage of requiring a deeper anterior chamber than forceps. Generally speaking, when vision in the better eye is reduced to 20/100 because of cataract, lens extraction is advisable. Interference with a filtering scar in a lens extraction is usually ill advised; incisions should be lateral or inferior to the filtering scar.

In chronic glaucoma with operable cataract, if tension is reasonably low a lens extraction with a complete iridectomy usually involves the least risk. The two stage operation has the disadvantage of double exposure to both trauma and infection as well as their complications such as uveitis, vitreous loss, and lens dislocation. Only the removal of the lens, because of the reduction of the volume of the intraocular contents may permanently reduce the tension. If tension is above 35 mm. Hg a two stage operation is preferred with a minimal interval of six months between operations.

In co-existent glaucoma and cataract, miotics usually must be supplemented sooner or later by surgery. The earlier the surgery is done the better and operations which may have to be repeated, such as cyclodialysis, cyclodiathermy, iridectomy, and sclerotomy should be avoided. Surgery with filtering cicatrices and iris inclusion is preferred to operations of the Elliot and Lagrange type. Surgery should be directed against glaucoma primarily and secondarily against cataract. Cataract extraction in very hard eyes can only result in grave complications, such as extensive vitreous loss and intraocular hemorrhage. Intracapsular extraction is usually preferable if efficiently conceived and performed. Three illustrative cases are presented. Chas. A. Bahn.

Lavine, O., and Langenstrass, K. H. **A new drainage operation for the relief of glaucoma.** Am. J. Ophth. **31**:78-80, Jan., 1948. (4 figures.)

Mulock Houwer A. W. **Leucoma adherens and glaucoma.** Ophthalmologica 113:303-308, May, 1947.

Mulock Houwer reports a case of secondary glaucoma after gonorrheal keratoconjunctivitis in a native of the Dutch East Indies. The upper-temporal sector of the cornea was very thin and ectatic (apparently a keratectasia after a large gonorrheal ulcer). Two tags of pigmented tissue with fringes projecting into the anterior chamber were attached to the posterior surface of the ectatic portion of the cornea. Mulock Houwer interprets these findings as follows: in the large ulcer that occupied the upper-temporal sector of the cornea, a small perforation occurred. Because of the presence of posterior synechias the iris prolapse remained very small. After an absence of the chamber for several days the corneal perforation became water tight, the chamber was restored and the anterior synechias broke, leaving only tags of iris tissue on the posterior surface of the cornea. During the absence of the chamber peripheral anterior synechias formed, and gave rise to secondary glaucoma. The author's main point is that the peripheral and not the central anterior synechias are the cause of secondary glaucoma after corneal perforation.

Peter C. Kronfeld.

Mulock Houwer A. W. **The pathology and therapy of corneal fistulas.** Ophthalmologica 113:309-315, May, 1947.

The article is based upon the author's very extensive experience with cases of corneal fistula following severe keratoconjunctivitides (mostly gonorrheal) in natives of the Dutch East Indies. His conclusions are very similar to those of Kronfeld (Am. J. Ophth. 23:1014, 1940) based on the latter's experiences in North China. The main fact to be kept in mind is that the fistulous eye depends upon the fistula for maintenance of a normal intraocular pressure. The normal outflow channels have been closed and the fistula has become the safety valve of the eye. The fistula can only be closed by giving the eye other channels of outflow. This is best accomplished by one or two cyclodialyses after which the fistula usually becomes obliterated. Kronfeld prefers Wootton's combined iridectomy and cyclodialysis followed by excision and keratoplastic repair of the fistula.

Peter C. Kronfeld.

Natale, Amadeo. **Evaluation and mechanism of the destructive effect of ocular hypertension.** Arch. d'opht. 7:129-147, 1947.

This complete and well documented review of the subject of the pathogenesis of glaucoma does not lend itself well to abstracting. The review considers first the clinical significance of increased intraocular pressure and the methods of measuring it. The relation of intraocular pressure to venous and arterial pressures and to the pressure of the spinal fluid is considered. Natale concludes that the figures commonly given for the intraocular pressure are too high. He notes the lack of correlation between the degree of pressure rise and the visual functions. Next in order are considered angioscotometry and its significance, the theories of the origin of the aqueous, provocative tests, and the significance of extraocular nervous factors and such other extraocular factors as hypertension and edema. Gonioscopy and aqueous veins are also discussed and, finally, the diagnostic value of observations on the papillomotor reflex.

Phillips Thygeson.

Redslob, Edmondo. **The treatment of hydrophthalmia.** Ann. di ottal. e clin. ocul. 72:449-454, Aug., 1946.

The treatment of hydrophthalmos must generally be surgical. The operation of choice is a perforating diathermy coagu-

lation of the ciliary body, as described by Vogt, which requires less precision than the usual decompressive procedures and can be done rapidly under local anesthesia. Hydrophthalmos is frequently a manifestation of hereditary syphilis and general anesthesia may be fatal because of dysfunction of the liver. Redslob employs a simpler technique than Vogt's: he makes a series of eight diathermy punctures around the limbus, two in each quadrant, 2 mm. from the cornea. He does not incise the conjunctiva but makes each perforation through both conjunctiva and sclera, with a needle about one millimeter long, which is applied for one or two seconds. When the needle is withdrawn a trace of clear liquid (watery vitreous) may be seen to exude. This augurs well for the success of the operation. He thinks that the operation is effective not only because it inhibits the secretion of the aqueous but also because it produces a kind of fistulization.

Redslob has used this method in about 50 cases of glaucoma of every kind, and has not observed the least complication. On the day following operation the tension may be elevated, but two or three days later it falls and may remain at a normal level or even lower. The operation has proved ineffective in hemorrhagic glaucoma, but in simple glaucoma the results are excellent.

Harry K. Messenger.

Reese, A. B. **The significance of the base pressure in primary glaucoma.** Am. J. Ophth. **31**:25-27, Jan., 1948.

Talbot, Craeme. **Alternative operations to corneo-scleral trephining in treatment of glaucoma.** Supp. New Zealand M. J. pp. 37-38, 1947.

Cyclodialysis may be done in eyes with chronic simple glaucoma when the tension is below 40, in aphakia, and when the disease is not quite controlled with miotics. Delayed re-formation of the anterior chamber is seldom met with in cyclodialysis. Cataract formation and late infection is reduced in cyclodialysis in comparison with trephining.

Irwin E. Gaynon.

10

CRYSTALLINE LENS

Clapp, C. A. **Some medico-legal aspects of traumatic cataract.** South. M. J. **40**: 998-1000, Dec., 1947.

Fifteen percent of 300,000 eye injuries each year are associated with lens opacities. Penetrating wound and contusion cataracts should be observed for a minimum of three months to be sure the opacity is complete. If complete loss of vision is present, the cataract should be removed. Concussion cataract may be diagnosed by the rosette formation. Malingering should be tested for.

Irwin E. Gaynon.

Focosi, Marcello. **Answer to the note of Dr. Foddis concerning the central scotomas produced by changes in the posterior lens capsule of aphacic eyes.** Boll. d'ocul. **26**:98-102, Feb., 1947.

A patient operated on for senile cataract by extracapsular extraction, with round pupil, had 10/10 corrected vision; one year later, corrected vision was only 3/10 and a relative central scotoma for red was present. This scotoma disappeared after discission of the secondary membrane and vision returned to 10/10. The author asked Professor Vasco Ronchi for an explanatory discussion which is reprinted in extenso. Ronchi agrees with the explanation previously given by Focosi that the central scotoma in these cases is due to a deterioration of the retinal image, attributable to the irregular opacification of the posterior lens capsule.

K. W. Ascher.

François, J. **Glaucoma and cataract.** Ann. d'ocul. **180**:457-465, Aug., 1947. (See Section 9.)

Jones, Edgar. **Comments on hypoparathyroidism and cataract formation.** Am. Practitioner **2**:167-169, Nov., 1947.

Lack of parathyroid hormone allows calcium in the aqueous to penetrate the lens capsule which results in the formation of cataracts after exposure to ultraviolet light. This may occur after thyroidectomy. Two cases are reported. One patient did not wear glasses and developed bilateral cataracts. The second patient wore glasses which presumably gave protection against exposure to ultraviolet light and did not develop cataracts.

Irwin G. Gaynon.

Stallard, H. B. **Cataract.** Practitioner **158**:383-393, May, 1947.

The etiology of cataract is discussed briefly. Important factors are the biologic effects of senescence, local disturbances in the metabolism of the lens that result from specific diseases and the effect upon the lens of such general metabolic disturbances as vitamin deficiencies and endocrine dysfunctions. Lens changes occur in 96 percent of persons over 60 years of age. The degree to which the patient is incapacitated in relation to his particular type of work is the factor which determines when operation should be performed. Unilateral mature cataracts should be kept under observation and operation performed at the first signs of onset of hypermaturity. The author advocates the use of corneo-scleral sutures to close the wound. Ninety-six percent of patients operated on for cataract recover useful vision. Benjamin Milder.

Pittar, C. A. **Intracapsular cataract extraction.** Supp. New Zealand M. J. pp. 13-17, 1947.

A method of intracapsular cataract extraction is described. The author uses keratome and scissors section, peripheral iridectomy, and extraction and seals the conjunctival flap to the episcleral tissues by forming a coagulum with plasma.

Irwin E. Gaynon.

Vos, T. A. **"Extraction en carré" of secondary cataracts.** Ophthalmologica **113**: 319-320, May, 1947.

The author describes the following method for the partial extraction of secondary cataracts: a central square "window" is cut into the secondary cataract by means of two discission knife-needles. First, the two vertical sides of the window are cut with a discission knife introduced through the temporal part of the limbus. With another needle-knife introduced at 6 o'clock the two horizontal cuts are made. Finally, the square piece is removed through a small keratome incision from below. "The greatest advantage of the method is that traction on iris or ciliary body is avoided." The author does not state how many times he has used this method or what his results have been. Peter C. Kronfeld.

Wolfe, O. R. **Twenty years experience with the Barraquer technic of cataract extraction.** J. Internatl. Coll. Surg. **10**:398-403, July-Aug., 1947.

A conjunctival flap, keratome section and enlargement of the incision is made with scissors. Conjunctival sutures are placed in the 10, 12 and 2 o'clock positions. The Barraquer vacuum forceps is applied to the lens capsule. The lift on the lens is made forward toward the center of the cornea, while counter pressure is made just below the limbus on the vitreous thereby performing a combined extraction. The erisphake is the best means of grasping the capsule in intumescent and immature cataracts.

Irwin E. Gaynon.

11

RETINA AND VITREOUS

Bjork, Stina. **Haemodynamic factors and retinal changes in hypertensive diseases.** Acta. Med. Scan. suppl. 175, pp. 1-165, 1946.

This monograph summarizes a study on 228 patients of three years' duration. In an attempt to uncover information about the origin and development of the hypertensive diseases, the patients were divided into two major age groups, from 14 to 40, and from 41 to 65.

The study consisted of a blood pressure measurement (after Korotkoff) and an analysis of the circulation (after Broemser and Wezler-Boger). The eye examination consisted of a measurement of vision and a refraction, ophthalmoscopic examination, measurement of the caliber of the retinal vessels (after Lobeck) and determination of the diastolic pressure of the central retinal artery (after Bailliart).

The 117 patients with essential hypertension, were found to have a narrower arterial caliber than the 59 with normal circulation. There was no significant difference in the caliber of the vessels in essential hypertension with and without retinopathy. The 34 patients with nephritis with or without retinopathy did not show a significant difference in arterial caliber when compared with normal subjects. The 11 patients with diabetes mellitus with hypertension and retinopathy did not show any significant differences in the factors which determine blood pressure when compared to findings in patients showing the same retinal picture with hypertension alone. The seven cases of thrombosis of the central retinal vein with hypertension show the same haemodynamic factors as cases of essential hypertension without fundus changes.

The author feels that the recording of the diastolic pressure of the central retinal artery yielded no information of importance beyond that obtained by recording the diastolic blood pressure in the brachial artery.

The development of fundus changes is due to a disturbance of nutrition in the retina. This is brought about by the early loss of elasticity of the large vessels arising from the heart. The appearance of a gradual increase in the total peripheral resistance with a simultaneous decrease in the cardiac output then causes a gradual diminution of the blood supply to the retina, with a local anoxemia. (18 figures, 18 tables.) H. C. Weinberg.

Couadau, A., and Planques, P. **Ophthalmoscopy in malignant arterial hypertension.** Rev. oto-neuro-oftal. **22**:27-31, March-April, 1947.

In individuals over 50 years of age with chronic essential hypertension there are found the usual permanent lesions due to changes in the arteriolar and capillary walls, marked elevation of retinal arterial tension, and spasmodic exudative lesions such as hemorrhages, exudates, and edema. Occasionally one finds central vein thrombosis and almost total spastic arterial closure. In malignant arterial hypertension the eye changes occur between 25 and 50 years of age. Here the dangerous prognostic picture is neuroretinitis, in addition to hemorrhages, exudates, and spastic arterioles.

Edward Saskin.

De Ruyter, J. **The pathogenesis of lesions involving the ganglion of the optic fascicle.** Ophthalmologica **113**:276-279, May, 1947.

The author's main point is that in a number of diseases which have been designated as retrobulbar neuritis the lesion is actually in the ganglion cell layer of the retina and not retrobulbar. If it were retrobulbar it should not be called neu-

ritis because the optic nerve is not a nerve, and also because the pathological process is usually not inflammatory. It has been definitely established that in methyl alcohol intoxication in man the multipolar ganglion cells of the retina are primarily affected. In tobacco and ethyl alcohol poisoning as well as in luetic optic atrophy the primary site of the lesions in the third neuron may also be in the ganglion cell layer of the retina. The author tries to correlate this apparent vulnerability of the ganglion cells with their ascorbic acid content (the other retinal layers containing practically no ascorbic acid). "In case of the development of a lesion of the optic fascicle due to tabes, we will try to improve the defective cell respiration by putting the required vitamins at the disposal of the cells. It must still be elucidated if ascorbic acid gives better results than the vitamins of the B group." Peter C. Kronfeld.

Doucet, P. **Softening of the retina in sectors and its relation to detachment.** Arch. d'opht. 7:167-170, 1947.

Doucet considers the various theories of the origin of retinal detachment, including traction by vitreous strands and retinal holes due to cystoid degeneration and choroidal atrophy. Cases have occurred in which white retinal streaks with obliterated vessels and atrophy of nerve tissue have been noted. The author reports two observations illustrating this type of retinal change. In his first case a man of 33 years with 16 diopters of myopia gradually lost vision in the right eye over a period of several years. There was a large flat detachment of the retina that involved the area about the macula, with a sector-like vascular disturbance and gross retinal lesions that consisted of spots of retinal atrophy.

In the second case a man of 37 years with a history of active tuberculosis had a detachment in the left eye following a tuberculous iridocyclitis with multiple iris tubercles. The detachment was sector-like in character and had a single radial tear at 2 o'clock. This was closed by operation. After operation the lesion could be seen to be essentially a degeneration of the retina consecutive to an incomplete arterial thrombosis. The area of retinal disturbance continued to increase, however, and the detachment later recurred.

The author concludes that in both these cases an arterial lesion was at fault, resulting in multiple lenticular plaques of retinal atrophy. He believes that arteritis unquestionably plays a role in the production of certain cases of retinal detachment. Phillips Thygeson.

Fischer, F. P., and Moorrees, H. G. **"Camp eyes" and solar retinopathy.** Ophthalmologica **114**:10-15, July, 1947.

During 1945 and 1946 two types of disturbances of central vision made their appearance in the Dutch Eye Clinics: (1) the cases of "camp eyes" in persons that had been released from the Japanese camps for civilians and prisoners of war in the Dutch East Indies and had returned to Holland, and (2) cases of solar retinopathy in residents of Holland who during the partial solar eclipse of 1945 had exposed their eyes to an excessive dose of sunlight.

Fischer and Moorrees were struck by the similarity between the two diseases. Fischer had had considerable experience with severe cases of solar eclipse retinopathy (results of the eclipse of 1912) and Moorrees had been an internee in one of the Japanese camps for Dutch civilians on Java from 1942 to 1945. There he had daily contacts with early and advanced stages of "camp eyes."

The permanent residues of both diseases are very similar indeed. The central area is riddled with small scotomas which produce annoying metamorphopsia, but are compatible with a visual acuity up to

20/40. Ophthalmoscopically, the pigmentation in the macular region is irregular (most noticeable in red-free light), and the normal reflexes are absent.

The question arises how a fairly diffuse macular lesion such as is entailed in solar retinopathy can lead to multiple small scotomas which break the central area up in many little islands. To answer this question, Fischer and Moorrees invoke the theory of Hartridge according to which the retinal cones are normally arranged in clusters.

"Camp eyes" is undoubtedly a disease of undernourished people living in the tropics. Malnutrition of the same or greater severity such as must have prevailed in many parts of Europe did not produce "camp eyes." Since life in the Dutch East Indies entails more exposure to sunlight than life in Central or Western Europe, the authors feel justified in attributing the retinal damage in "camp eyes" to the action of the tropical sun upon a tissue that has become sensitized to light by a dietary deficiency such as is present in pellagra. The authors thus consider "camp eyes" primarily a retinopathy and not an optic nerve lesion. Treatment is effective only in the earliest stages of the disease. Peter C. Kronfeld.

Jona, S., and Camerini, R. **Therapy of retinitis pigmentosa by irradiation of Budge's ciliospinal center.** Riv. oto-neuro-oftal., **22**:66-84, Jan.-Feb., 1947.

The writers consider spasm and hyaline degeneration of blood vessel walls to be important factors in the pathogenesis of retinitis pigmentosa. They report various means to control spasm and mention the surgical procedures upon the cervical sympathetic system. They tried inhibition of the cervical sympathetics by irradiation. In five out of seven patients of the same family the treatment was followed by an improvement either in visual power or in visual field. A hyaline degeneration of vessel walls was excluded in the five patients. It is the writers' opinion that irradiation therapy has the advantage over surgical therapy that it may be repeated. (Bibliography.)

Melchiore Lombardo.

Katzin, H. M., and Blum, John. **Transplantation of vitreous. A preliminary report.** Brit. J. Ophth. **31**:760-766, Dec., 1947.

The authors review the literature on transplantation of the vitreous and report the results of experiments of vitreous transplant in rabbit eyes. The vitreous can usually be successfully transplanted. This is better than replacement with saline. It is, however, not without complications such as retinal detachment, traumatic cataract and fibrous tissue proliferation. Vitreous haze, thought to be due to alteration in physico-chemical properties of the injected vitreous, was present in a high percentage of the transplants, but usually cleared completely. (16 references.) O. H. Ellis.

Miller, A. J., and Cuttino, J. T. **On the mechanism of production of massive preretinal hemorrhage following rupture of a congenital medial-defect intracranial aneurysm.** Am. J. Ophth. **31**:15-24, Jan., 1948. (7 figures, 30 references.)

Oxilia, Efisio. **Vascular anomalies of the retina: prepapillary arterial loop.** Ann. di ottal. e clin. ocul. **72**:408-427, July, 1946.

A case is described and pictured of a prepapillary arterial loop of three spiral twists projecting two millimeters from the retina into the vitreous in the left eye of a 42-year-old woman. One limb arises from the disk, and the other is connected with a vessel on the retina. The distribution of the vessels, which are moderately tortuous, is irregular. The lower nasal quadrant is supplied at least in part from

the superior nasal branch of the central retinal artery, and a cilioretinal artery is present on the temporal side.

Oxilia reviews the literature on congenital vascular anomalies of the fundus since 1858, and of four hypotheses prefers that advanced by Little in 1881, according to which the loop is due to the exaggeration of the tortuosity of a single retinal vessel during the period of development.

Harry K. Messenger.

Redslob, E. **The pathogenesis of retinitis pigmentosa.** Ophthalmologica **113**: 290-302, May, 1947.

Redslob reports the case of a female infant, 14 months of age, who shortly after vaccination against smallpox lost most or all the sight in both of her eyes. The pupils were in the state of amaurotic fixation. The fundi showed severe retinal ischemia. After six weeks of treatment with vasodilators and arsenicals the vision returned and the pupils resumed their normal activity. The discs, however, remained pale, the retinal vessels markedly narrowed and the eyegrounds retained the appearance of "pallor" that made Redslob think of arterial spasm in the choroid in addition to the retinal angiospasm. Ten years later he saw the child again. According to the parents, she had developed normally, had learned to read and write and did well in school. She herself complained of poor vision at night. Her corrected central vision was 0.5 in each eye, the visual fields were tubular and the fundi showed the picture of a typical advanced pigmentary degeneration of the retina.

Redslob reviews the theories concerning the pathogenesis of pigmentary degeneration of the retina. He concludes that these degenerations must be divided into two main groups, the so-called independent forms which are not due to heredity but to injuries, infections, intoxications; and the second group in which heredity is the basis of the retinal degeneration as well as of the associated neurological and other disturbances. The case reported in the paper belongs to group one.

Peter C. Kronfeld.

Stearns, S., Friedman, E., Lugitch, M., and Hoffman, S. H. **Lipemia retinalis.** New England J. Med. **238**:16-17, Jan. 9, 1948.

This, the sixty-third case of lipemia retinalis to be reported, occurred in a four and one half-year-old girl. There was an associated diabetic acidosis and a blood cholesterol of 1010 mg. per 100cc. The pupils were equal and active and the lenses were clear. In each eye the fundus was pale and the vessels were cream-colored ribbons. Arterioles and veins were indistinguishable.

Irwin E. Gaynon.

Wasmund, C. W. **A study of the angle of bifurcation of retinal vessels.** Am. J. Ophth. **31**:12-15, Jan., 1948.

12

OPTIC NERVE AND CHIASM

Levin, S., Trevett, L. D., and Greenblatt, M. **Syphilitic primary optic atrophy.** New England J. Med. **237**:769-772, Nov. 20, 1947.

This is a review of 54 cases seen at the Boston Psychopathic Hospital during the years 1921-1944. Gradual visual loss was the first manifestation of trouble in 63 percent. The serologic reactions in untreated cases is negative only rarely. Pupillary abnormalities were present in 49 out of 51 (Argyll-Robertson in 36 of these). Tabetic features were mild, and no patient had marked ataxia. Visual fields showed moderate irregular constriction. The spinal fluid generally was strongly abnormal (Group III, paretic type). Without treatment there was frequent visual loss of 1/200 or less in both eyes within twelve months, which empha-

sizes the need for prompt treatment. Chemotherapy is no guarantee that optic atrophy will not occur. Treatment does not necessarily improve vision, but there is hope that it will keep it from deteriorating. The optic atrophy may respond well provided treatment is started soon enough. Artificial fever is an important addition to therapy. (1 table, 1 figure, references.) Bennett W. Muir.

McLean, J. M., and Ray, B. S. **Soft glaucoma and calcification of the internal carotid arteries.** Arch. Ophth. **38**:154-158, Aug., 1947.

In 1932 Knapp reported cases of atrophy of the optic nerve with shallow cupping, defects of the visual fields which tended toward altitudinal hemianopsia and persistently normal tension. He was able to demonstrate roentgenographically the calcification of the arteries at the base of the brain in all 10 cases. The authors report a similar case in a man aged 61 years. The patient had had various diagnoses of glaucoma in spite of low intraocular pressure and had had an iridectomy done in one eye. Roentgenograms of the skull were normal and failed to disclose any unusual sclerosis of the carotid arteries. An exploratory craniotomy was done. Both optic nerves were longer than usual and ran up over the internal carotid arteries. Both nerves appeared atrophic. At the point where the nerves crossed the arteries they were flattened in ribbon-like fashion. The internal carotid arteries beneath were sclerotic, and each had a calcified plaque in its wall directly under the nerve. On direct observation, these calcified plaques could be seen hammering against the optic nerves with each pulse beat. It was felt that nothing constructive could be done. The patient made an uneventful recovery with no change in the visual status. John C. Long.

Salgado Benavides, E. **A contribution to the study of the non-pathologic optic papilla.** Arch. Soc. oft. hisp.-amer., **7**:756-770, Aug., 1947.

Eleven physiologic variations of the optic disc are described and illustrated; they include a disc with an epipapillary membrane projecting above its level; an apparent folding of the nasal over the temporal portion of the disc, produced by a thin membranous formation, over the physiological excavation of the disc, perforated by the retinal vessels; myelinated nerve fibers; hyaline membranes enveloping the central vessels; and unusually large excavations, one of which approaches the size of a coloboma of the disc. A case of a papilla, in which the excavation is divided into two portions by a vertical band of fibrous tissue is, according to the author, the third case of this type to be reported in literature. Ray K. Daily.

Vail, Derrick. **The blood supply of the optic nerve and its clinical significance.** Am. J. Ophth. **31**:1-12, Jan., 1948. (References.)

13
NEURO-OPHTHALMOLOGY

Bachstez, E., and Baumgärtel, K. **Sources of error in the examination of the pupil.** Wien. klin. Wchnschr. **59**:666-669, Oct. 10, 1947.

For the attainment of consistency and uniformity in the results of pupillary examination it is necessary not only to avoid gross errors of method but also to bear in mind the complex factors that determine the behavior of the pupils. It is the latter especially with which the authors concern themselves.

Ideally the source of light and the spot on the retina that is illuminated should be constant and the retina should be in a known state of adaptation. It is essential that the retina be dark-adapted, that the patient look into the distance to com-

pletely relax accommodation, that each eye be tested separately, and that the light fall on the fovea. Contraction to light is a true reflex, convergence contraction is an accompanying movement similar to the narrowing of the pupil when the lids are pressed together.

The dilatation which follows contraction should not be disregarded. Inhibition of the sphincter can be brought on by fear, surprise or a sudden thought. Redlich's symptom (widening of the pupil when the hands are firmly pressed together) is an example of this kind of inhibition. The sensory reflex can come from the region supplied by the trigeminal nerve and from other parts of the body, notably the skin. Auditory stimuli and the phases of respiration also act on the state of the pupil. A "paradoxical reaction," i.e. light seeming to dilate the pupil is always due to one of these outside causes.

A number of examples are cited to show how errors in diagnosis arise. The pupil is never in a state of rest. The evaluation of pupillary findings is most difficult in neurologic patients because of the many neuro-vegetative disturbances to which such patients are subject.

B. T. Haessler.

Cojazzi, L., and Sala, O. **Researches on the interference between the optokinetic nystagmus and caloric and postrotatory ones induced simultaneously in man.** Riv. oto-neuro-oftal. **22**:50-65, Jan.-Feb., 1947.

The writers report the phenomena of interference which manifest themselves in man after optokinetic, caloric and postrotatory nystagmus are provoked. Normal individuals were examined. The optokinetic nystagmus was induced by the rotation of a cylinder with white and black stripes set in motion electrically with constant speed. For the caloric stimulation they used Veits's method and for the rotatory Buys-Fischer's. The optokinetic nystagmus constantly inhibited a provoked vestibular nystagmus of opposite direction and replaced it. The suppression of the labyrinthine nystagmus lasts as long as the optokinetic stimulus in an opposite direction is active; if the latter ceases the vestibular nystagmus reappears with its former characteristics. The normal phasic development of post-rotatory nystagmus is not at all modified by the interference of the optokinetic. When the calorific nystagmus has subsided for one or two minutes a "facilitation" is instituted for the optokinetic nystagmus towards the side to which the preceding caloric nystagmus had been directed. (Bibilography.)

Melchiore Lombardo.

Ferrata, Luigi. **Ocular changes in Paget's disease.** Ann. di ottal. e clin. ocul. **72**:557-565, Sept., 1946.

A 53-year-old woman affected with Paget's disease for four years had diminution of vision, decrease of normal winking, exophthalmos, neuroparalytic keratitis (hypesthesia, loss of epithelium, and opacities), and papilledema with possible optic atrophy. These manifestations are all ascribed to mechanical factors arising from extensive osteitis deformans at the base of the skull. There was marked narrowing of the sphenoidal fissure. (References.) Harry K. Messenger.

Focosi, M., and Maggioni, G. **Ophthalmoplegic hemicrania of Charcot from aneurism of internal carotid artery.** Boll. d'ocul., **25**:537-551, Oct.-Dec., 1946.

A boy, six years of age, had vomiting without nausea in the early morning followed by intense headaches, especially in the right fronto-orbital region. This condition lasted for one day and was followed by ptosis of the right upper lid. The eyeball deviated outward, and the excursions of the eyeball inward, upward and downward were abolished. The pupil was

dilated and the accommodation was paralyzed. These symptoms gradually disappeared. A few months later they reappeared and arteriography of the brain revealed a round dilatation of the internal carotid artery in the clinoidal region. The etiology, pathogenesis and location of the lesion are discussed at length. (4 figures, bibliography.) Melchiore Lombardo.

Hughes, E. B. C. **The visual fields in indirect injury of the optic nerves.** Tr. Ophth. Soc. U. Kingdom. **65**:35-46, 1945.

Visual field defects were found to fall into distinct groups in indirect injuries to the optic nerve, the so-called typical group and those of widely different types.

Indirect injuries of the optic nerve usually present instantaneous loss of vision, and appearance of primary optic atrophy in about three weeks, with minimal recovery in the first four weeks. The visual field defect involves the inferior part of the field of the affected eye. The depression field occasionally spreads to the upper half of the field. The upper nasal quadrant was least frequently affected by this depression. Three cases presented arcuate scotomata of the nerve fiber bundle which seemed to be associated with vascular lesions of the optic nerve.

In the operative treatment of these cases one must consider the removal of bone fragments, collections of blood within the nerve sheath, and local subdural haematomata. (8 figures.)

Beulah Cushman.

Lijó Pavia, J. **Retino-hypophysary syndrome. Treatment with gonadotropine. Four new cases.** Rev. oto-neuro-oftal. **22**:5-9, Jan.-Feb., 1947.

This paper represents further investigation of a previously reported syndrome that embraces an unusual ophthalmoscopic picture, diminished central vision, atypical alterations of the visual fields, radiographic changes in the sella turcica and improvement with hormonal therapy. The present series consists of three women in the menopause and one male child eight years of age. There were sector defects and macular changes with typical sellar thinning. The central vision was always subnormal, ranging from 0.2 to 0.7. Hormonal injections were followed by only slightly improved vision but resulted in an increase in the sense of well-being. (4 figures.) Edward Saskin.

Lutt, C. J. **Denial of blindness and Argyll Robertson pupils without syphilis.** Bull. Los Angeles Neurol. Soc. **12**:189-191, Dec., 1947.

The author reports an interesting case of denial of blindness with the clinical symptoms of meningovascular syphilis. The latter was unverified. At autopsy it was found that the pupillary immobility to light was due to a vascular lesion in the mesencephalon. The nystagmus and the cerebellar ataxia were explained on the basis of cerebellar softening and blindness was clearly due to softening of both occipital lobes following occlusive vascular changes. As not all patients with cortical blindness have the delusion that they can see, this was ascribed to the mental state of the patient, who confabulated and showed visual agnosia before becoming completely blind. This case confirmed the fact that the clinical symptoms of meningovascular syphilis are not a specific manifestation of the spirochete, but of the anatomical site of the lesions.

O. H. Ellis.

Marín Amat, M., and Marín Enciso, M. **Visual symptoms as the first subjective manifestations of hypophyseal tumors.** Arch. Soc. oft. hisp.-amer. **7**:815-817, Aug., 1947.

A report of the data in a case of supracellar tumor with blindness and optic atrophy of the right eye, and one-sixth

visual acuity and incomplete optic atrophy of the left eye is presented. (2 illustrations.) Ray K. Daily.

Marmion, D. E., and Sandilands, J. **Opsoclonia: a rare ocular sign in polioencephalitis.** Lancet **2**:508-509, Oct. 4, 1947.

A description is given of a case of probable polioencephalitis exhibiting a bizarre type of nystagmoid movement of the eyes. It is suggested that this is probably identical with that previously described under the name "opsoclonia" by Orzechowski in 1927.

Theodore M. Shapira.

Marucci, Luigi. **The psychic restitution of the pupillary reflex when fatigued to light, as studied with the pupillographic method of Loewenstein and Borsotti.** Ann. di ottal. e clin. ocul. **72**:546-556, Sept., 1946.

A series of pupillograms is shown in which the restitution of the light-fatigued pupillary reflex occurs when the subject is stimulated psychically, as by a loud and unexpected noise. The pupillograms of patients with various neurologic and ocular disturbances are also shown, whereby the diagnostic and prognostic importance of this psychic restitution is demonstrated. The phenomenon is found to be dependent on the integrity of the sympathetic nervous system. (14 figures.)

Harry K. Messenger.

Nielsen, J. M. **Sensory perception through vision, a synesthesia.** Bull. Los Angeles Neurol. Soc. **12**:195-196, Dec., 1947.

The author reports a case of epilepsy in a young adult following an injury at two years of age to the right occipital lobe. Her aura was the appearance of a large dark object in her blind left field. In this homonymous hemianopic field the presence of objects and a faint light were "felt" with either eye—a sensory response, a form of synesthesia. It was thought that the impulse reached the right thalamus and registered as a tactile impression. O. H. Ellis.

de Ocampo, Geminiano. **Latent nystagmus following head injury.** Arch. Ophth. **37**:775-779, June, 1947.

A man, aged 24 years, a Filipino veteran of Bataan, received an injury to the left occipitoparietal area from fragments of an artillery shell. Eight months later it was observed that with the eyes in the primary position for far vision, there was no definite nystagmus. With the eyes right, spontaneous, transient, jerky horizontal nystagmus of both eyes to the right was present. With eyes left, a similar nystagmus, of lesser intensity, was noted. Caloric tests showed vestibular hyposensitivity, but the rotatory test revealed a stronger or longer state of irritability on the right side.

Various theories of the causation of nystagmus are discussed. The peripheral sensory stimuli and the state of stability of the lower coordinating centers, as well as the balance of the innervating influence of the higher voluntary and involuntary centers, must be considered as a whole in the explanation of the mechanism of latent nystagmus, and probably of all nystagmus. John C. Long.

Rubino, A. **"Arachnitis," "Endocraniosis" and Opticochiasmatic arachnoiditis.** Riv. oto-neuro-oftal. **22**:85-102, March-April, 1947.

A married woman, 37 years of age, had had headaches since girlhood and, for the previous ten years, gradually failing vision. At the examination the vision of the right eye was found to be reduced to the recognition of hand movement and of left eye to 1/50. There was optic atrophy, the discs had slightly indistinct margins, the retinal arteries were contracted and

the veins enlarged. Absolute upper hemianopsia and absolute central scotoma were present in the right eye. In the left eye the hemianopsia was relative, and the central scotoma was relative for white and absolute for colors. Radiography showed a thickening of the skull especially in its frontal region, a calcification left of the midline and signs of chronic pansinusitis. The Pirquet reaction was strongly positive. A diagnosis of optico-chiasmatic arachnoiditis with meningo-endocraniosis was made. At the operation a right frontal flap was made. A marked thickening of the bone was found, the dura was found to be very thin and adherent to the bone. The optic nerves were reduced to half-normal size. The anatomic-clinical and etiopathologic relation that occurs between optico-chiasmatic arachnoiditis and primary arachnitis as well as endocraniosis is discussed. This is the third case reported in the literature. A classification of the various clinical forms of optico-chiasmatic arachnoiditis of the group of meningo-endocranioses is proposed. Melchiore Lombardo.

14

EYEBALL, ORBIT, SINUSES

Bianchi, G. **Two cases of cavernous agioma of the orbit.** Rassegna ital. d'ottal. **16**:317-334, Sept.-Oct., 1947.

Two cases of cavernous angioma of the orbit are reported. The difficulty of exact diagnosis of the nature and site of such tumors is pointed out. The author recommends a comparison of the white blood cells found in the general circulation with those obtained by exploratory puncture of the angioma. The latter is characterized by a definite increase in the eosinophiles and basophiles, and the presence of immature cells. Histological examination of the tumors confirmed these findings. Accumulation of lymphocytes appear to initiate the formation of the fibrous tissue of the tumor. The lumen of vessels showed an increase of white cells and a decrease of the red. Good results were obtained in each case by removal of the tumors through Krönlein incisions. (5 figures.) Eugene M. Blake.

Hope-Robertson, W. J. **Pseudotumour of the orbit.** Supp. New Zealand M. J. pp. 18-30, 1947.

A pseudotumour of the orbit in a 43-year-old man is described. The pathology, differential diagnosis and treatment is discussed and a plea is made for biopsy as an aid to diagnosis. (5 figures.)
Irwin E. Gaynon.

Kaplan, Morris. **Boeck's sarcoid. Report of case with an unusual precipitating factor.** Am. J. Ophth. **31**:83-85, Jan., 1948.

15

EYELIDS, LACRIMAL APPARATUS

Bloch, F. J. **Minor anomalies in position of the eyelashes.** Arch. Ophth. **37**: 772-774, June, 1947.

Aberrant eyelashes may grow upward either subcutaneously or subconjunctivally. The subconjunctival growth is much the more important as the cilium may pierce the conjunctiva and rub upon the cornea. Both of these anomalies are explained on a mechanical basis. The sprouting cilium encounters an obstacle and is bent backward. Two cases are reported, one of cilium incarnatum externum and one of cilium incarnatum internum. John C. Long.

NEWS ITEMS

Edited by DONALD J. LYLE, M.D
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News items should reach the editor by the 12th of the month

DEATHS

Dr. Elmer Cleo Ambrose, Trenton, Missouri, died October 15, 1947, aged 55 years.

Dr. Louis Storrow Greene, Washington, D.C., died November 12, 1947, aged 74 years.

Dr. Oscar Wentworth King, Coral Gables, Florida, died October 16, 1947, aged 63 years.

Dr. Albert Howell Mann, Texarkana, Arkansas, died October 16, 1947, aged 48 years.

Dr. Elmer Eason McKeown, Denver, Colorado, died October 7, 1947, aged 67 years.

Dr. Joel Whitaker, Indianapolis, Indiana, died October 13, 1947, aged 70 years.

ANNOUNCEMENTS

AMERICAN BOARD EXAMINATIONS

The American Board of Ophthalmology announces that practical examinations will be given in Baltimore from May 20 to 25, 1948, and in Chicago from October 6 to 9, 1948.

Written qualifying tests will be held annually, probably in January of each year. Applicants for the January, 1949, written qualifying tests must be filed with the secretary, Dr. S. Judd Beach, Cape Cottage, Maine, before July 1, 1948.

DIRECTORY SUPPLEMENT AVAILABLE

A supplement of diplomates from January, 1947, to January, 1948, will be sent gratis to all purchasers of the directory of the American Board of Ophthalmology. This supplement is arranged alphabetically and geographically. No biographic material is included.

Diplomates are urged to keep the executive office, Cape Cottage, Maine, informed of all changes of address, so that the files can be kept up-to-date.

ARMY POSITIONS OPEN

The U. S. Army Medical Corps now has a number of excellent positions which can be filled by physicians who have completed their formal board requirements (residence phase) but who need one or two years of practice limited to their specialty. Seven openings in eye, ear, nose, and throat have been announced; and three openings in ophthalmology. Eligible physicians are asked to communicate with The Surgeon General, U. S. Army, Washington 25, D.C., giving the following information: name, address, age, nationality, marital status, dependents, with age of each, medical school and graduation date, internship and date, specialty and geographic location desired, contemplated length of service, and details of prior military service.

MISCELLANEOUS

CINCINNATI HAS EYE LABORATORY

The department of ophthalmology of the University of Cincinnati College of Medicine is establishing an eye laboratory under the direction of Dr. Donald J. Lyle. At present the work of the laboratory is concerned with the examination of eyes for diagnosis and the preparation of specimens for study and collection. Physicians of Ohio, Indiana, and Kentucky will have access to the services and facilities of the laboratory which is temporarily located in Pavilion A of the Cincinnati General Hospital. The Eastern Hills Lions Club made the first gift to support the laboratory.

FUCHS'S "HISTOPATHOLOGY OF THE EYE"

The second volume of *Histopathology of the Eye* by Adalbert Fuchs is now available. It can be obtained from the publisher, Franz Deuticke, Helferstorferstrasse 4, Vienna, Austria. The price is $17.00.

SOCIETIES

BETTER VISION INSTITUTE

The increased radio activity for 1947 was outstanding among the reports at the meeting of the Better Vision Institute in New York on January 16. A total of 524 radio stations throughout the United States and Canada have requested the new series, "Eyes on the Ball."

Another significant 1947 project was the development of a new series of 24 educational brochures covering every aspect of eye science and service intended for the use of professional persons and for distribution to schools, libraries, and museums.

MEXICAN SOCIETY FORMED

The Sociedad de Oftalmologia de Guadalajara (Mexico) was organized on November 27, 1947, for the development of scientific investigation in ophthalmology, improvement of the members, and the development of measures for prevention and cure of blindness. The honorary president of the new society is Dr. Enrique Avalos; Dr. Elias Mendoza Gonzalez is acting president; Dr. Manuel Romo, vice-president; Dr. Antonio Diaz Geurrero, treasurer; and Dr. L. Nuñez Leal, secretary.

READING MEETING

Dr. William J. Hertz of Allentown, Pennsylvania, spoke on "Office Procedures in Ophthalmology and Otorhinolaryngology Based on 40 Years' Experience," at the January 21 meeting of the Reading Eye, Ear, Nose, and Throat Society.

Cleveland Ophthalmological Club

At a recent meeting of the Cleveland Ophthalmological Club, the following officers were elected: Dr. John E. L. Keyes, president; Dr. George King, vice-president; and Dr. Roscoe J. Kennedy, secretary-treasurer.

During the fall and winter months, the club has had many interesting programs. At the September meeting, Dr. John M. McLean, New York, spoke on "Vertical Factors in Strabismus." This lecture was illustrated with many excellent slides showing various conditions encountered and the results obtained.

Dr. Alson E. Braley, New York, was the guest speaker at the November meeting. His paper was on "Virus Diseases of the Cornea."

Residents in ophthalmology from the Cleveland hospitals were guests of the club at the January meeting. They presented the following interesting and instructive program: "Sturge-Weber Disease: A Case Report," Dr. Luebert Docter; "Use of Di-isopropyl Fluorophosphate in Selected Cases of Glaucoma," Dr. J. H. Graham; "Cataract Associated with Myotonic Dystrophy: A Case Report," Dr. H. H. Hardesty; "Zonular Cataract: A Case Report," Dr. J. I. Moreland; "Eale's Disease: A Case Report," Dr. Howard Possner; "Oculoglandular Tularemia Treated with Streptomycin: A Case Report," Dr. J. E. Springer.

Chinese society celebrates founding

The Chengtu Eye, Nose, Ear, and Throat Society celebrated its tenth anniversary on December 20, 1947. Dr. T. H. Lan, professor of biochemistry, West China Union University, was the guest speaker. He spoke on "Biochemistry of the Blood in Patients Suffering from Malignant Tumors." The history and progress of the organization were reviewed by Dr. K. C. Lang and Dr. E. Chan.

N.S.P.B. conference

The 1948 conference of the National Society for the Prevention of Blindness will be held at the Radisson Hotel, Minneapolis, Minnesota, April 5 to 7.

Brooklyn program

At the 103rd regular meeting of the Brooklyn Ophthalmological Society, Dr. Charles E. Iliff presented a paper on "The Use of Beta Irradiation in Ophthalmology." The discussion was by Dr. Ira I. Kaplan. The following were presented for election to membership: Dr. David A. Anderman, Dr. Martin Bodian, Dr. Regina Gilroy, and Dr. Charles Labriola.

Research Association meeting

The Association for Research in Ophthalmology, Inc., will hold its annual meeting in Chicago on June 21 and 22. The place of the meeting will be Thorne Hall, Northwestern University Medical School, 303 East Chicago Avenue.

Personals

Dr. Dunphy appointed Williams Professor

Dr. Edwin B. Dunphy has been named the Henry Willard Williams Professor of Ophthalmology at Harvard University. This is one of the older chairs of ophthalmology in American universities. Dr. Dunphy's predecessors and their years of office are: Dr. Oliver Fairfield Wadsworth, 1899-1903; Dr. Miles Standish, 1909-1914; Dr. Alexander Quackenboss, 1920-1923; Dr. George Strong Derby, 1923-1931.

Dr. Dunphy succeeded Dr. J. Herbert Waite as executive head of the department of ophthalmology at Harvard University Medical School in 1940, as clinical professor of ophthalmology. Dr. Dunphy continues as executive head of the department, with the new title Henry Willard Williams Clinical Professor of Ophthalmology.

Lectures in Chicago

Dr. Adalbert Fuchs gave a series of lectures at the University of Illinois, Chicago, on January 30 and 31 and February 1.

Dr. Post gives Gifford Lecture

Dr. Lawrence T. Post of St. Louis presented the fourth annual Sanford R. Gifford Memorial Lecture to members and guests of the Chicago Ophthalmological Society, at the Murphy Memorial Auditorium, Chicago, on January 26. The subject of his address was "Practical Considerations in the Diagnosis and Treatment of Strabismus."

Cleveland newcomer

Dr. Russell Nichol has recently opened offices for the practice of ophthalmology in Cleveland, Ohio. Dr. Nichol was formerly a member of the staff of the Eye Institute, College of Physicians and Surgeons, Columbia University, New York.

Professor Lindner speaks at Gill

On the evening of February 24, Prof. Karl Lindner, chief of the eye clinic, University of Vienna, Vienna, Austria, spoke at the Gill Memorial Eye, Ear and Throat Hospital, Roanoke, Virginia. His subjects were: "Therapeutics on Diseases of the Eye," and "New Eye Operations."